

MORPHOLOGY OF THE CHEEK TEETH
OF EARLY
SOUTH AFRICAN HOMINIDS

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The University of Alberta
Printing Department
Edmonton, Alberta

Sts - Max.

ts - Mand.

LD - Max.

LD - Mand.



Sts - Max.

ts - Mand.

LD - Max.

LD - Mand.



ATLAS
OF
PHOTOGRAPHS AND RADIOGRAPHS
OF THE
JAWS AND TEETH
OF
EARLY SOUTH AFRICAN HOMINIDS

Geoffrey H. Tsonber

A Thesis Submitted to the Faculty of Science, University of Witwatersrand,
Johannesburg, for the Degree of Doctor of Philosophy.

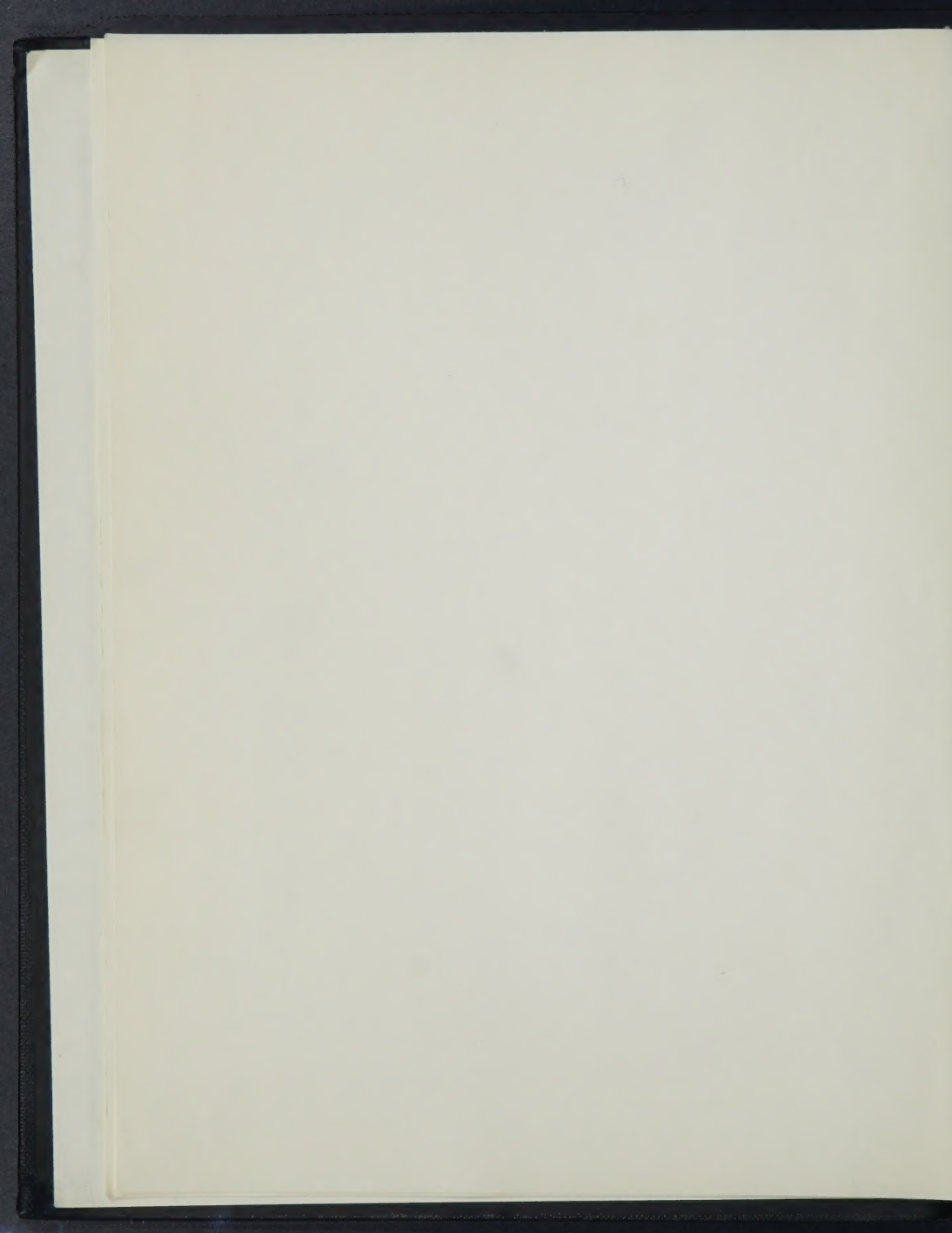
Edmonton, 1974

Sts - Max.

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PLATE
OF
PHOTOGRAPHIC AND FACSIMILE
OF THE
JAWS AND TEETH
OF
EARLY FOSSIL MAN

London: H. Kegan Paul

A book submitted to the Faculty of Science, University of Westminster,
London, for the Degree of Doctor of Philosophy.
London, 1934

ATLAS OF JAWS AND TEETH OF EARLY SOUTH AFRICAN HOMINIDS

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Mandibular Teeth

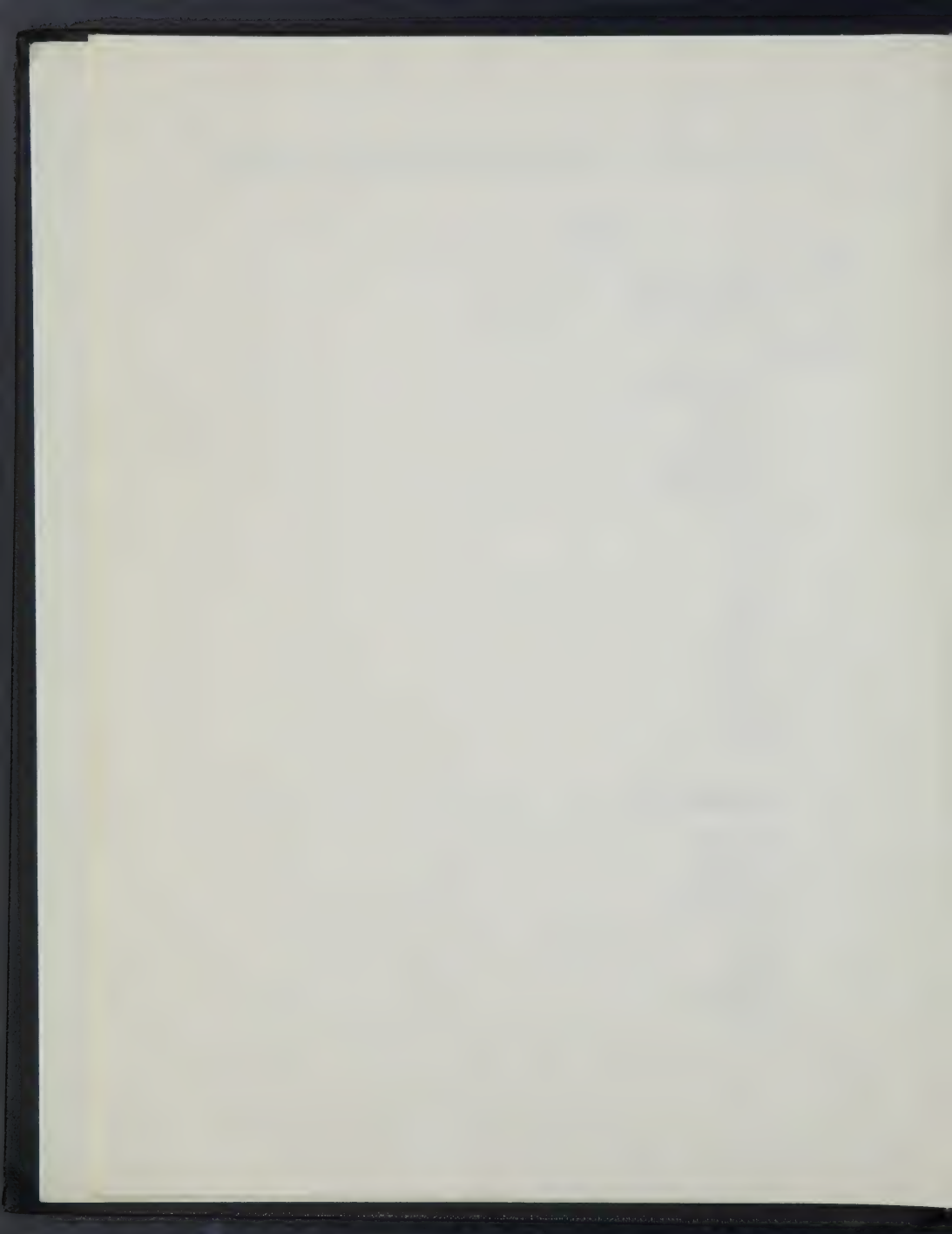
Sterkfontein

Maxillary Teeth:

TM 1511
TM 1512
StW Hom 1/68
StW Hom 2/69
Sts 1
Sts 2
Sts 7
Sts 8
Sts 27
Sts 28
Sts 32
Sts 52(a)
Sts 53
Sts 54
Sts 55
Sts 57
Sts 61

Mandibular Teeth:

TM 1518
TM 1519
TM 1520
StW Hom 3/69
Sts 4
Sts 9
Sts 18
Sts 51
Sts 52(b)
Sts 59



Makopansgat

Maxillary Teeth:

MLD 6

MLD 9

MLD 28

Mandibular Teeth:

MLD 2

MLD 5

MLD 18

MLD 19

MLD 40

Kromdraai

Maxillary Teeth:

TM 1517

TM 1601

Mandibular Teeth:

TM 1517

TM 1600

Swartkrans

Maxillary Teeth:

SK 11

SK 13

SK 14

SK 24

SK 46

SK 52

SK 55(a)

SK 61

SK 65

SK 74(c)

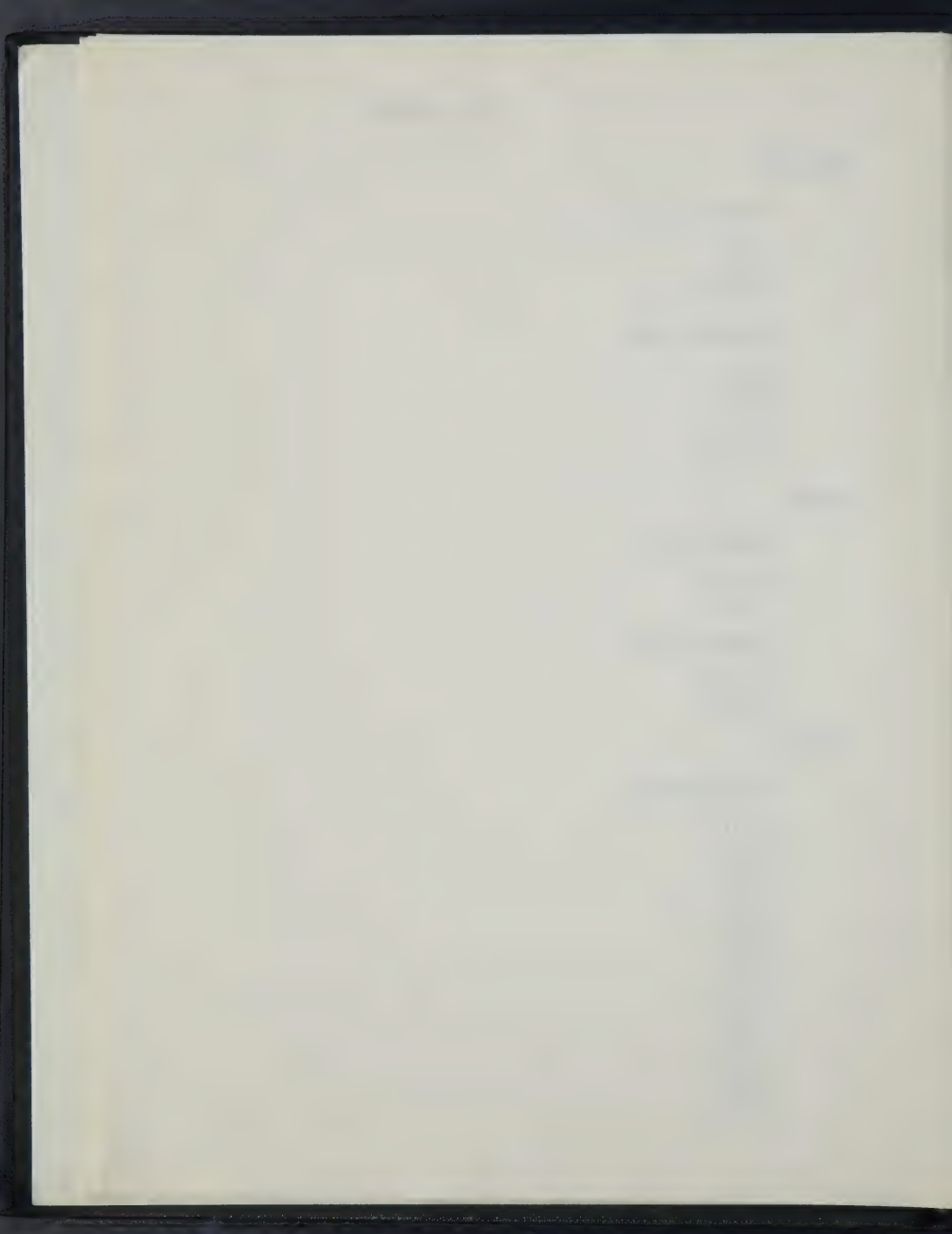
SK 79

SK 826(a)

SK 838

SK 877

SK 1400



Swartkrans: (Con.t)

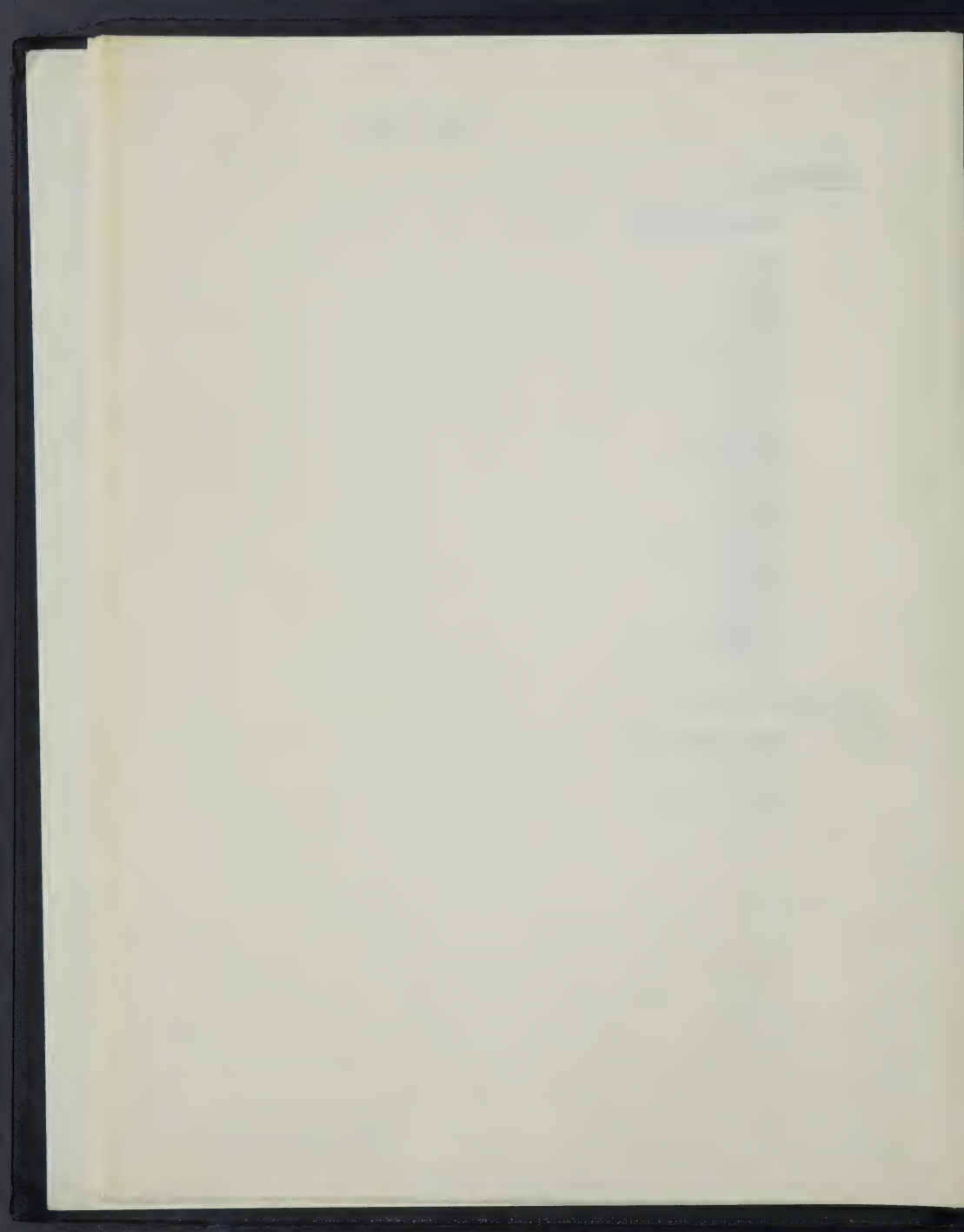
Mandibular Teeth:

SK 6
SK 12
SK 23
SK 30
SK 55(b)
SK 61
SK 62
SK 63
SK 64
SK 74(a)
SK 88
SK 824
SK 826
SK 843
SK 844
SK 857
SK 876
SK 883
SK 1587(a)
SK 3978

Swartkrans Hominines

Mandibular Teeth:

SK 15
SK 45



Sts - Max.

Sts - Mand.

0 - Max.

0 - Mand.



TAUNG

Maxillary Teeth

Kr - Ma

Sts - Max.

ts - Mand.

LD - Max.

DD - Mand.



Kr - Mand.

Sfs - Max.

Sfs - Mand.

LD - Max.

LD - Mand.

Taung

Radiograph of the left maxilla revealing the erupted dm^1 , dm^2 and M^1 and portions of the crowns of the unerupted P^3 and M^2 . Superimposition of the cusps of M^1 create a multituberculate effect. The radio-opacity in the M^1 pulp chamber is probably created by super-imposed alveolar bone. The curved alignment of these cheek teeth to one another is noteworthy.

Magnification: approximately 3x.

Taung

Radiograph of the right maxilla from the buccal aspect revealing the erupted dm^2 and M^1 and portions of the crowns of the unerupted P^3 , P^4 and M^2 . The pulp chambers of the dm^2 and M^1 are clearly evident, the latter projecting exceptionally high "pulp horns" into the dentine. The multi-tuberculated appearance of the M 's occlusal surface is due to superimposition of the cusp shadows.

Magnification: approximately 3x.



Kr - M.

Sts - Max.

Sts - Mand.

Sts - Max.

Sts - Mand.



Kr - M

Sts - Max.

Sts - Mand.

Ln - Max.

Ln - Mand.

Taung

Radiograph of the right maxilla from the palatal aspect revealing the erupted dm^2 and M^1 and the unerupted P^4 and M^2 . The pulp chambers of the erupted teeth are clearly revealed, that of the M^1 being of mesotaurodont form.

Magnification: approximately 3x.



Kt - N

Sts - Max.

Sts - Mand.

LD - Max.

LD - Max.



Kr - Max.

Sts - Max.

Sts - Mand.

Ln - Max.

Ln - Mand.



TAUNG

Mandibular Teeth

Kr - Max.

Sts - Max.

Sts (Hom) - Mand

Sts - Max.

Sts - Mand.



Kr - Max.

Ses - Max.

Stc (Ham) - Mand.

LD - Max.

LD - Max.

Taung

Radiograph of the left mandible from the lingual aspect showing crypts of the unerupted P_3 and P_4 (arrows) and the erupted dm_2 and M_1 . The pulp chamber and roots of the dm_2 are visible in their entirety. Superimposition of the cusps of the M_1 create the multi-peaked effect seen.

Magnification: approximately 3x

Radiograph of the left mandible showing the full outline of dm_2 and M_1 . The partially calcified crown of the unerupted P_4 can be seen in the crypt beneath dm_2 . The incomplete formation of the roots of M_1 is evident. The ascending ramus of the mandible is seen to the right.

Magnification: approximately 3x

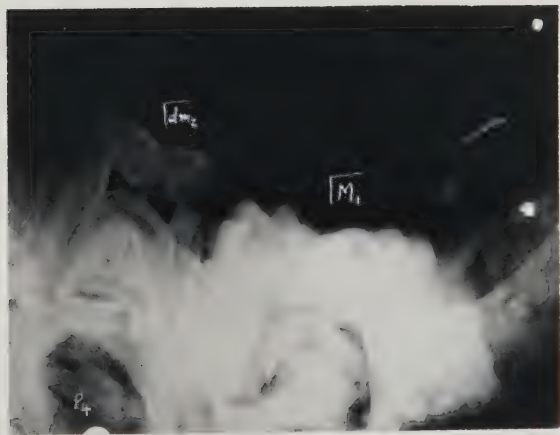
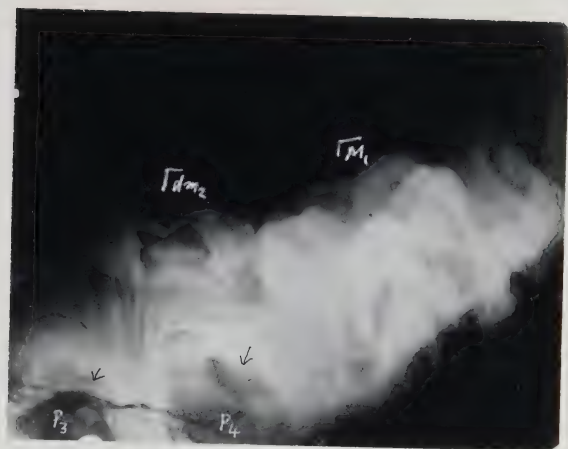
Kr - Max.

Ses - Max.

Sts (Hon) - Mand.

P.D. - Max.

P.D. - Mand.





Kr - Max.

Ses - Max.

sts - Mand.

LD - Max.

LD - Max.

Taung

Radiograph of the right mandible revealing the full outline of dm_2 and portions of the crowns of M_1 and P_4 . Damage to the right mandible accounts for the incompleteness of M_1 , and partial formation for the incompleteness of P_4 . Portion of the incomplete P_3 crown is seen to the extreme right of the photograph. The pulp chamber and root canals of the dm_2 are exceptionally clearly outlined.

Magnification: approximately 3x

Kr - Max.

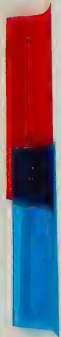
Sts - Max.

Sts (Ham) - Mand.

Sts - Max.

Sts - Max.





Kr - Max.

Sts - Max.

Sts - Mand.

LD - Max.

LD - Mand.



STERK FONTEIN

Maxillary Teeth

TM 1511
TM 1512
StW Hom 1/68
StW Hom 2/69
Sts 1
Sts 2
Sts 8
Sts 7
Sts 28
Sts 32
Sts 52(a)
Sts 53
Sts 61
Sts 54
Sts 55
Sts 27
Sts 57

Kr - Max.

Sts (Hom) - Mand.
Sts - Mand.

Sts - Max.



Kr - Max.

Sts (Item) - Mand.

Sts - Max.

Sts - Mand.

(Sterkfontein)

Occlusal view of maxillary cheek teeth in situ. The anterior teeth and right P^3 are missing. All the teeth present exhibit moderately severe attritional wear, most markedly on the occlusal and mesial aspects of the M^1 's. The M^2 's are seen to be considerably larger than the M^1 's. The M^3 's apparently had not erupted in this specimen. Note the distal talons on the P^4 's, demarcated by fissures, not as apparent on the P^3 .

Scale in centimetres.

Radiograph of $P^3P^4M^1$ reveals clearly their pulp chamber and root configurations as a result of the deposition of radio-opaque minerals along their surfaces. The mesotaurodontic nature of the M^1 pulp is seen, together with the outline of its two buccal roots and their contained root canals. The P^3P^4 pulp chambers are clearly seen. The roots of P^3P^4 cannot be seen in their entirety, and their numbers and lengths cannot be accurately determined. The intense petrification of the alveolar bone has created an effect nearly equal in radiodensity to that of the enamel, and in excess of the radiodensity of the dentine. The premolar pulp chambers have an oval outline also seen in SK 65 and TM 1517 from Kr (vide).

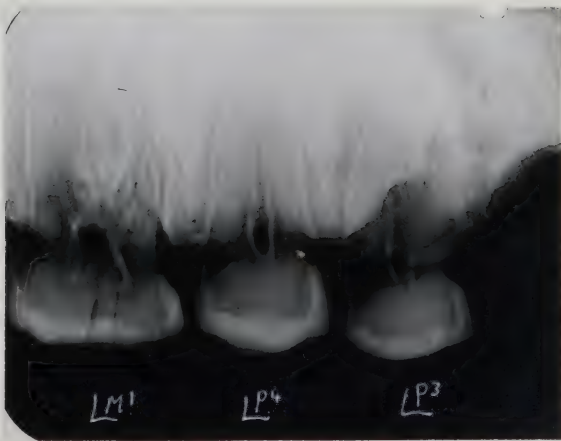
Magnification: approximately 3x.

Kc - Max.

St. (Horn) - Mand.
Sls - Mand.

LD - Max.

LD - Mand.





Kr - Max.

Sts - Mand.

D - Max.

Sts - Mand.

TM 1511

(Sterkfontein)

The buccal aspect of the left maxilla contains $P^3 P^4 M^1 M^2$. The very slight vertical grooves on the buccal aspect of the $P^3 P^4$ are evident, as are the more marked grooves between the paracone and metacone of the molars. The projection of the cervical enamel line into the buccal root bifurcation are seen to be slightly more developed in M^1 than in M^2 .

Scale in centimetres.

Radiograph of $M^1 M^2$, whose pulp chambers and roots are clearly outlined by a white, radio-opaque line of mineralization. The larger crown size of the M^2 (M-D: 14.9 mm) compared with M^1 (M-D: 12.3 mm) is evident. A mesotaurodontic configuration prevails in the pulp chambers of both molars. The outline of the two buccal roots of each molar is seen.

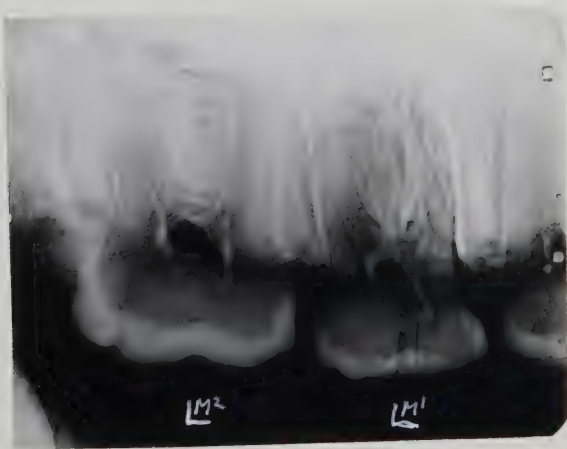
Magnification: approximately 3x.

Kc - Max.

Sts - Mand.

LD - Max.

LD - Mand.





Kr - Max.

Sts - Mand.

Sts (Hem) - M

LD - Max.

LD - Max.

TM 1511

(Sterkfontein)

The M^3 seen from its lingual aspect exhibits the Carabelli trait on the protocone (to the left) as two vertical grooves. The incomplete formation of the root indicates the individual was a young adult at death.

Scale in centimetres.

Radiograph of M^3 reveals the pulp chamber to be peculiarly remote from the crown and well within the root - a feature of taurodontism. The coronal dentine appears to be unusually thick.

Magnification: approximately 3x.

Kr - Max.

Gr. (Horn) - M
Sls - Mand.

LD - Max

LD - Mand



Red tab

Blue tab

Yellow tab

Kr - Max.

Sts - Mand.

DD - Max.

DD - Mand.

TM 1511

(Sterkfontein)

Radiograph of an isolated M³ reveals the incomplete formation of its roots, indicating that the individual was a young adult at death. The occlusal surface of the crown reveals the multi-tuberculated nature of the enamel.

The low undulations of the amelo-dentinal junction indicate that the elevations of the cusps are largely due to the great variations in enamel thickness.

The height of the pulp chamber is unusually low for an immature M³ approaching a cynodont configuration, and is in contrast to the mesotaurodont pulp chambers of the M¹ and M² of this individual.

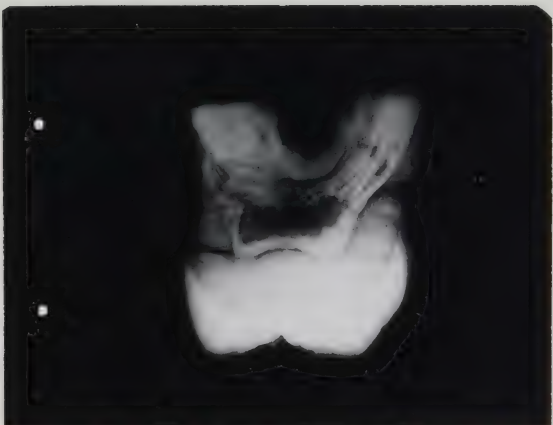
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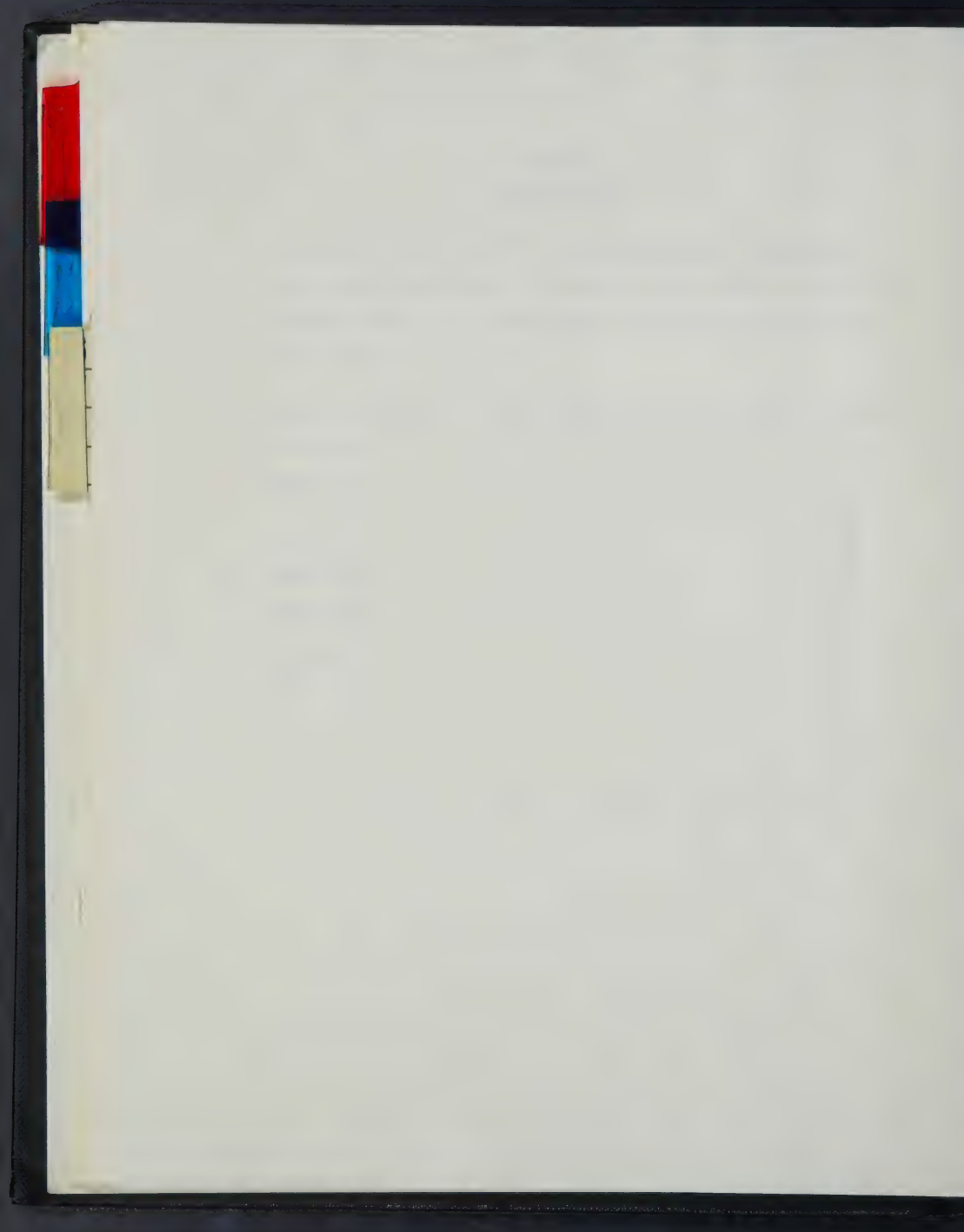
Kr - Max.

Sts - Mand.

10 - Max.

10 - Mand.





Kr - Max.

Sts - Mand.

Q.D - Max.

Q.D - Max.

(Sterkfontein)

The buccal aspect of the right maxilla containing I^2 , \underline{C} , P^3 and M^1 in situ. Horizontal lines of hypoplastic enamel (pits) are seen on I^2 and \underline{C} . The P^3 crown displays shallow mesial and distal vertical grooves. A shallow pit is seen to terminate the buccal groove on M^1 , and its cervical enamel margin dips slightly (Grade I) into its buccal root bifurcation.

Scale in centimetres.

Radiograph of the right maxilla containing P^3 and M^1 in situ. The absence of evidence of the P^4 roots, and the crater-like depression of the alveolar bone suggests the possibility of ante-mortem loss of P^4 . Both P^3 and M^1 crowns show moderate attritional wear. Dense petrification of bone obscures much of the detail of P^3 's roots.

The cynodont pulp chamber of M^1 is outlined by a radio-opaque layer of calcified breccia.

Magnification: approximately 3x.

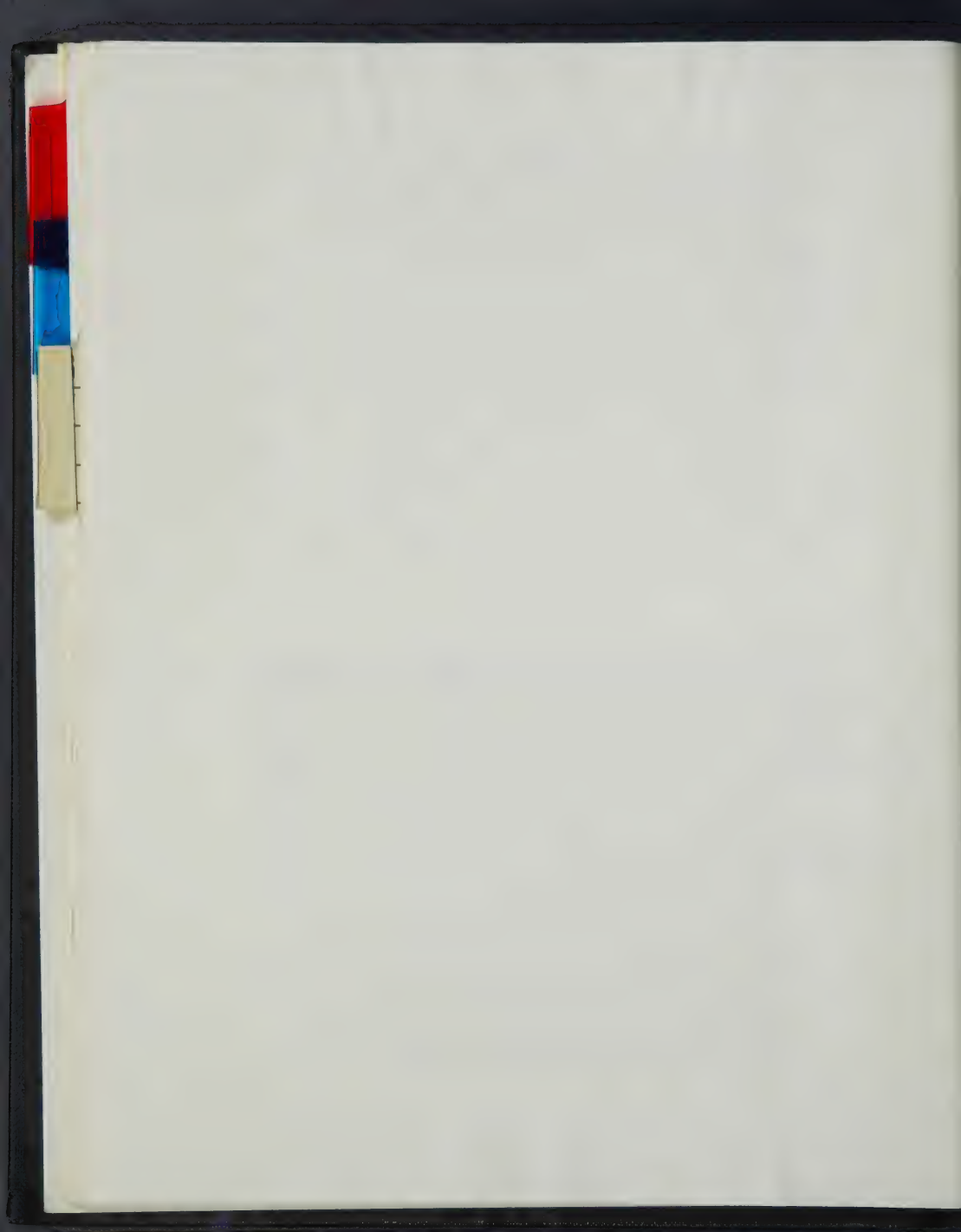
Ke - Max.

Sts - Mand.

LD - Max.

LD - Mand.





Kr - Max.

Sts - Mand.

LD - Max.

LD - Max.

St W Hom 1/68

Radiograph of an isolated right M¹ crown. The buccal and lingual edges of the worn occlusal surface are seen as wavy lines reflecting the scalloped occlusal table. The pulp chamber, of hypotaurodont form, is seen to be lined by lightly radio-opaque secondary dentine. The mesial and distal pulp horns are remarkable for their large size that, together with the root canals provide for an H-shaped outline. The roots of the tooth are obviously broken off.

Magnification: approximately 3x.

St W Hom 2/69

Radiograph of an isolated right M³ embedded in breccia. The small hypotaurodont pulp chamber is surrounded by extremely thick dentine walls. The roots and root canals are obscured by the densely radio-opaque breccia.

Magnification: approximately 3x.

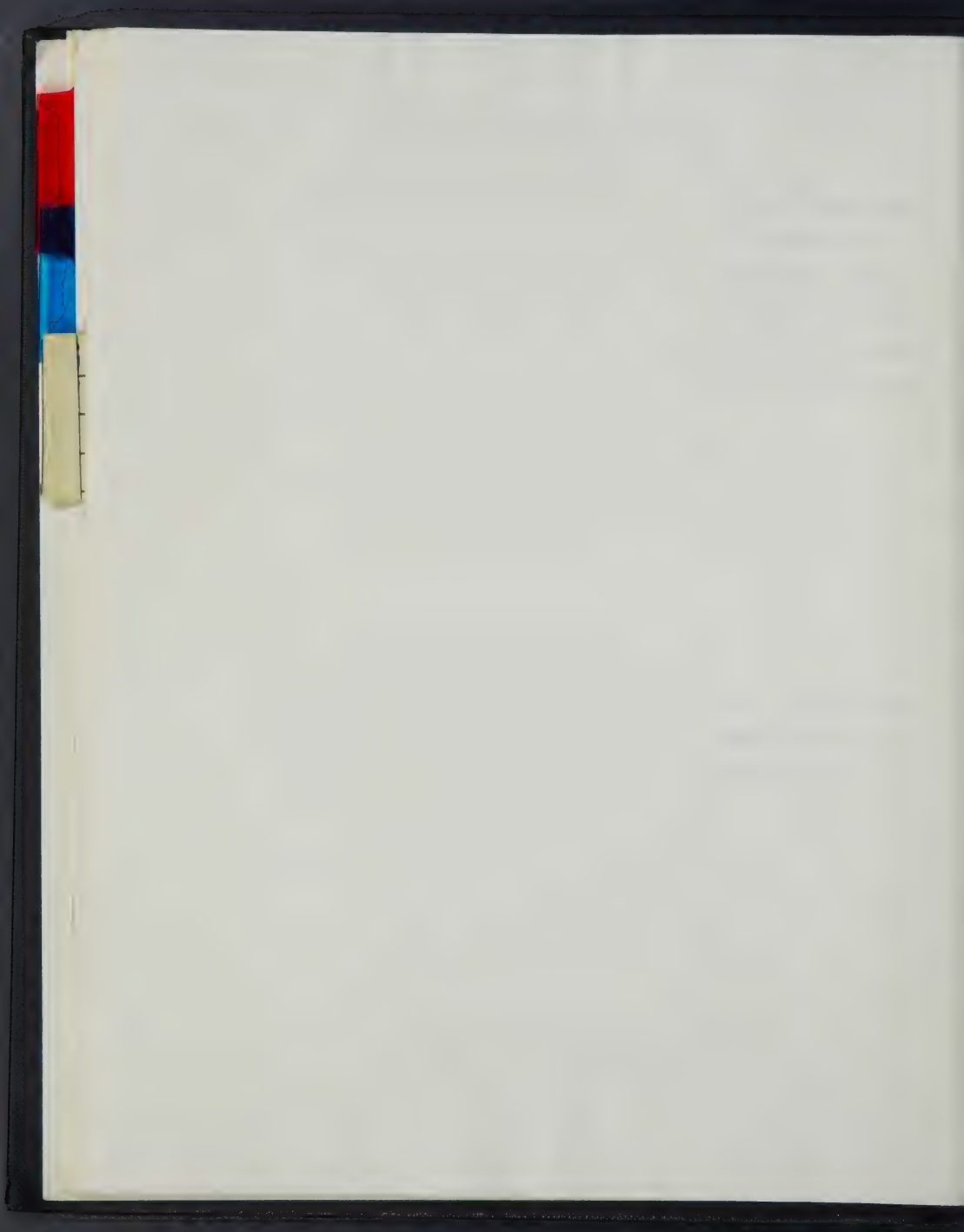
Kr - Max.

Sts - Mand.

LD - Max.

Sts - Mand.





Ke - Max.

Sts - Mend.

LD - Max.

LD - Mend.

Sts 1

Radiograph of the left maxilla containing P^3 and M^1 . The sharply pointed cusps of P^3 are noteworthy, and its narrow, elongated pulp chamber is outlined by a border of radio-opaque limestone breccia. The vague outline of the root suggests P^3 is uniradicular. The M^1 crown is only partially seen.

Magnification: approximately 3x.

Radiograph of the left maxilla containing M^1 and M^2 in situ. The large pulp chamber of M^1 is seen to be of mesotaurodont form, while the pulp chamber of M^2 is not discernible. Dense petrification of bone obscures the roots of the teeth.

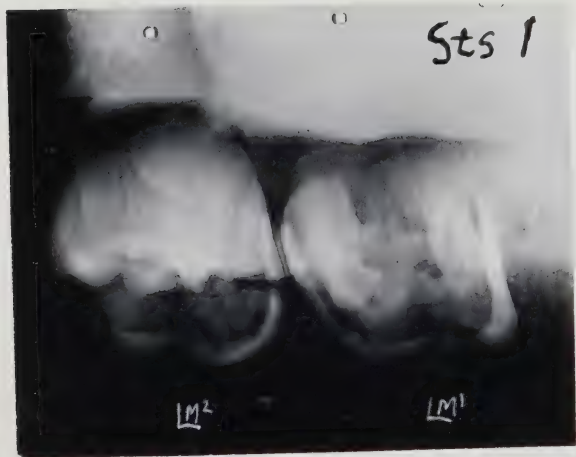
Magnification: approximately 3x.

Kr - Max.

Sts - Mand.

LD - Max.

Sts - Mand.





Kr - Max.

Sts - Mand.

Sts - Max.

Sts - Mand.

Sts 2

Radiograph of the left maxilla of a child containing the erupted dm^1 , dm^2 and the unerupted and partially formed crowns of P^3 , P^4 and M^1 . The pulp chambers of the deciduous teeth are exceptionally clearly outlined, and their splayed roots are seen to encompass the crypts of the early-forming premolar crowns.

The distal angulation of the M^1 crown is noteworthy, and the demarcation line between its enamel and dentine can be faintly discerned.

Magnification: approximately 3x.

Sts 8

Radiograph of the left maxilla of an adolescent containing M^1 , M^2 and M^3 in situ. The occlusal surface of M^1 is seen to be slightly worn, while that of the newly erupted M^2 is pristine, and M^3 is unerupted and incompletely formed.

The outline of the roots of M^1 and M^2 may be discerned, and their pulp chambers are clearly delineated, and are seen to be of hypotaurodont form. The densely radio-opaque outline of the M^2 pulp chamber may be due to the circumpulpal deposit of limestone-containing breccia.

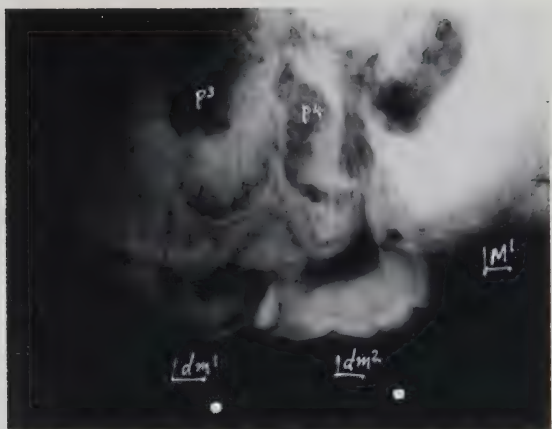
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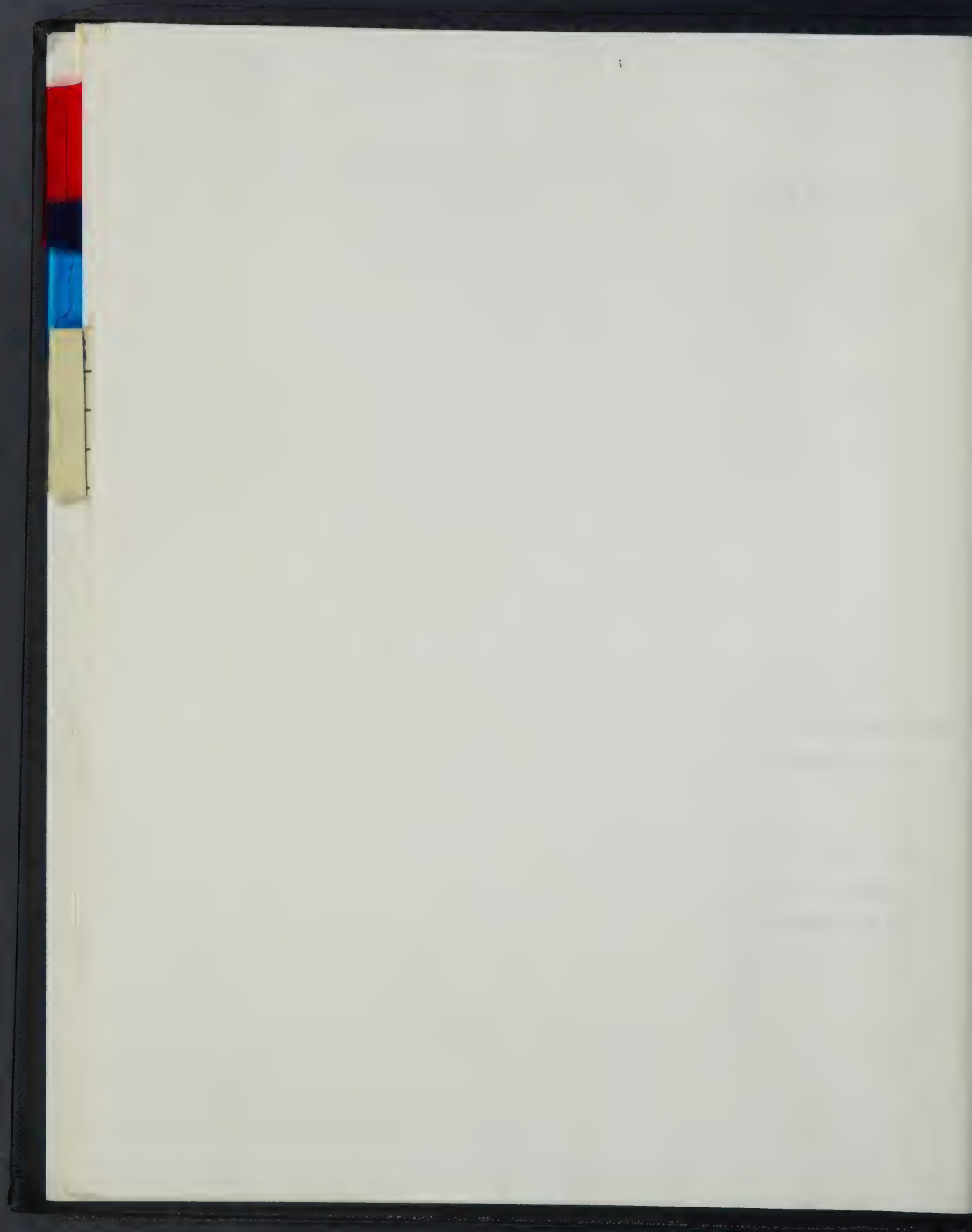
Kr - Max.

Ste - Mand.

PD - Max.

Q - Mand.





Kr - Max.

Sts - Mand.

ED - Max.

ED - Mand.

Sts 7

Photograph of the palatal aspect of the distorted maxilla containing all the teeth in situ. Very marked attritional wear of all the teeth is evident, suggesting a gritty diet was ingested even if the individual was of advanced age. Much of the occlusal anatomy of the teeth is destroyed, but the progressive increase in the size of the molar crowns from before backwards, $M^1 < M^2 < M^3$, is evident.

Scale in centimetres.

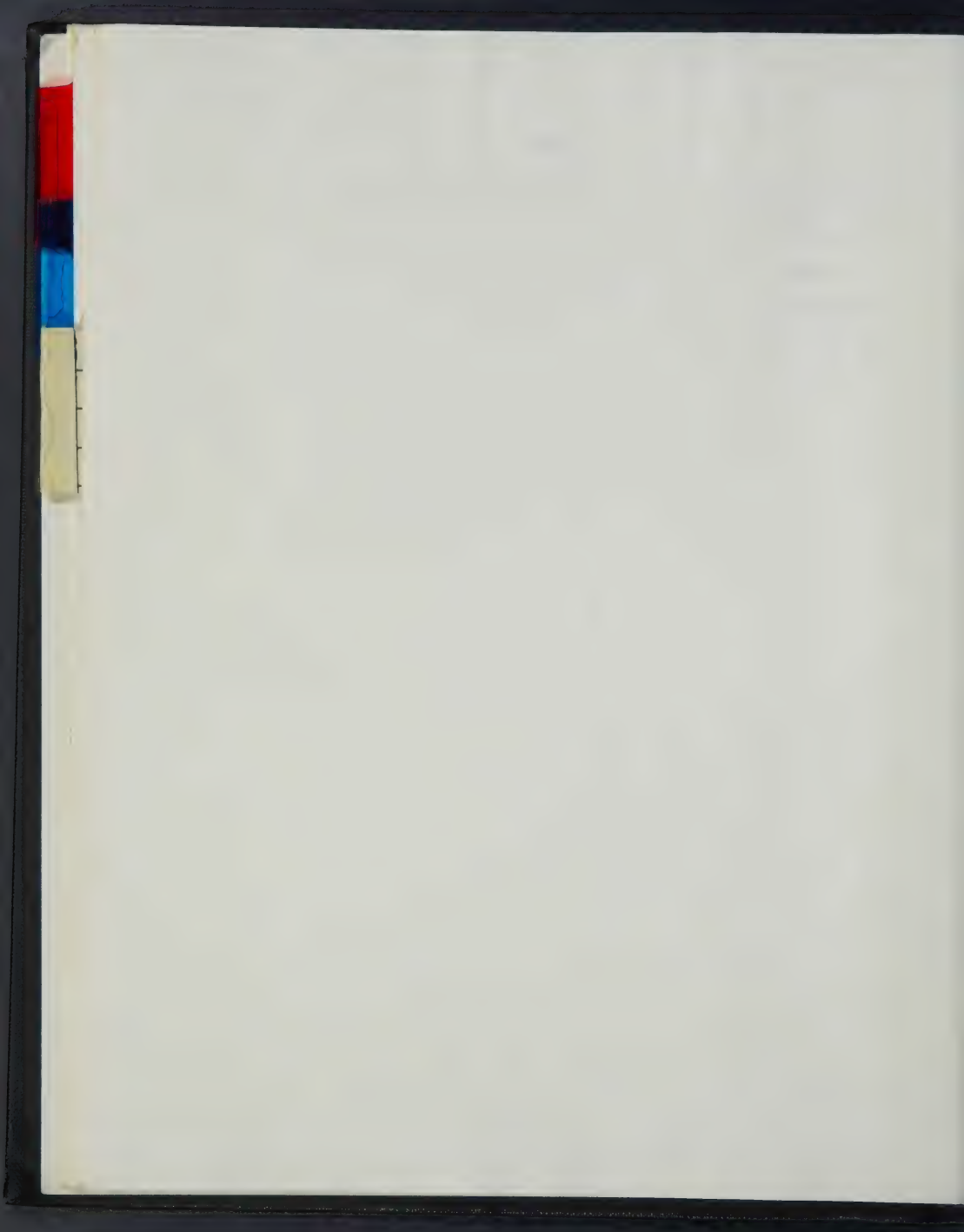
Kc - Max.

Sts - Mand.

D - Max.

D - Mand.





Kr - Max.

SK (Hom) -
Ses - Mand.

LD - Max.

LD - Mand.

Sts 28

Radiograph of a fragment of the right maxilla containing M^2 and M^3 in situ. The angle of the x-ray reveals both the buccal and lingual edges of the occlusal surfaces of both teeth. The complex cusp pattern of the fractured M^3 is seen as a 3-layered effect, reflecting its buccal, central and lingual cusps that obscure its pulp chamber. The roots of M^3 are destroyed.

The pulp chamber of M^2 is of indeterminate outline, but appears to be mesotaurodont in form. The roots are obscured by the bone and breccia in which they are embedded.

Magnification: approximately 3x.

Sts 32

Radiograph of a left M^2 contained in a fragment of maxilla. A considerable thickness of dentine separates the pulp chamber from the occlusal surface. The square pulp chamber is of mesotaurodont form, and is set in a wide "body" between crown and roots. The root canals appear to be occluded.

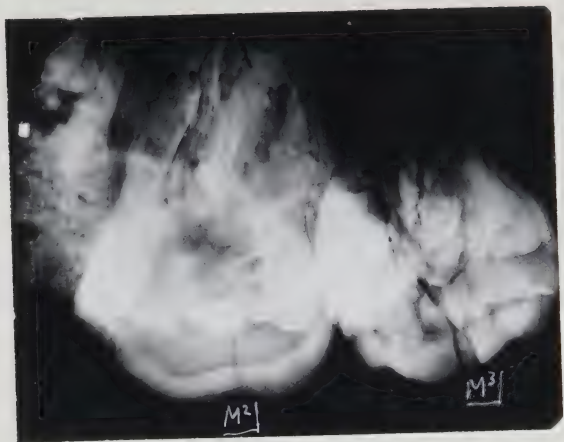
Magnification: approximately 3x.

Kr - Max.

Sts - Mand.

LD - Max.

LD - Mand.



Kr - Max.

Sts - Mand.

TD - Max.

CD - Mand.

Sts 52(a)

(Sterkfontein)

Occlusal view of the complete maxillary dentition. Warping of the maxilla has distorted the dental arch. As in the case of the mandible of this individual, the advanced occlusal attritional wear of the M^1 's attests to the precedence of their eruption over the other cheek teeth. The partially erupted M^3 's display wrinkling of the enamel of their occlusal surfaces. The carabelli cusp on the protocone is most prominent on the M^3 's, less so on the M^2 's, and is considered absent from the M^1 's.

Scale in centimetres.

Radiograph of the left maxilla containing the fully erupted M^2 and the partially erupted M^3 in situ. The roots of M^3 appear to be unformed, and its pulp chamber is wide open. The sharp, unworn cusp tips of M^3 contrast with the partially worn occlusal surface of M^2 .

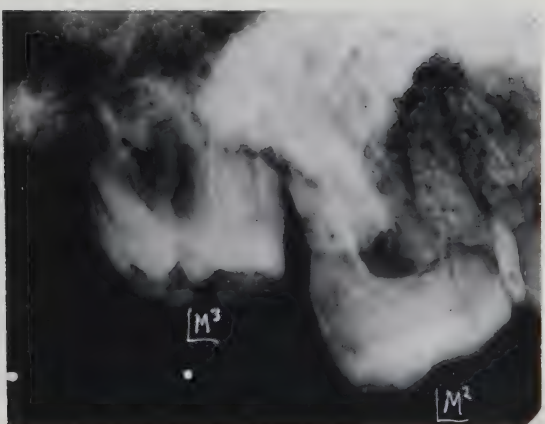
Magnification: approximately 3x.

Kr - Max.

SK (Hom) - Mand.
Sts - Mand.

ILD - Max.

ILD - Mand.



Kr - Max.

Sts - Mand.

RD - Max.

RD - Max.

Sts 52(a)

Radiograph of the left maxilla containing C, P³, P⁴ and M¹ in situ. Split open vertical fractures are seen in the crowns of P³, P⁴ and M¹. The crown of C is extremely radiolucent compared to the other teeth. The two premolar teeth appear to be uniradicular, and have long, narrow pulp chambers that continue into the root canals.

Magnification: approximately 3x.

Radiograph of the left maxilla depicting P⁴, M¹, M² and M³ in situ. The pulp chamber of M¹ appears extraordinarily large, and continues into the root complex - a hypertaurodont feature. The square pulp chamber of M² is of mesotaurodont form. Details of the roots of all the teeth are obscure.

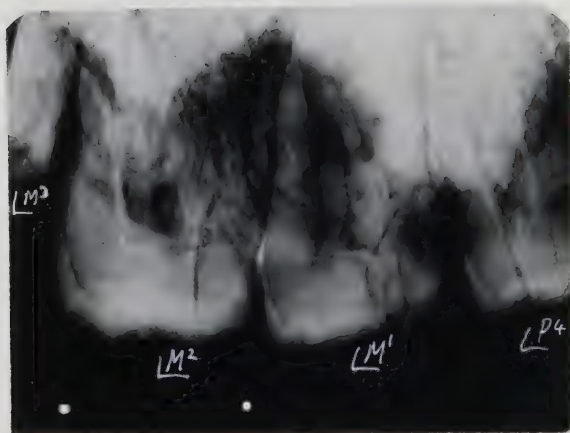
Magnification: approximately 3x.

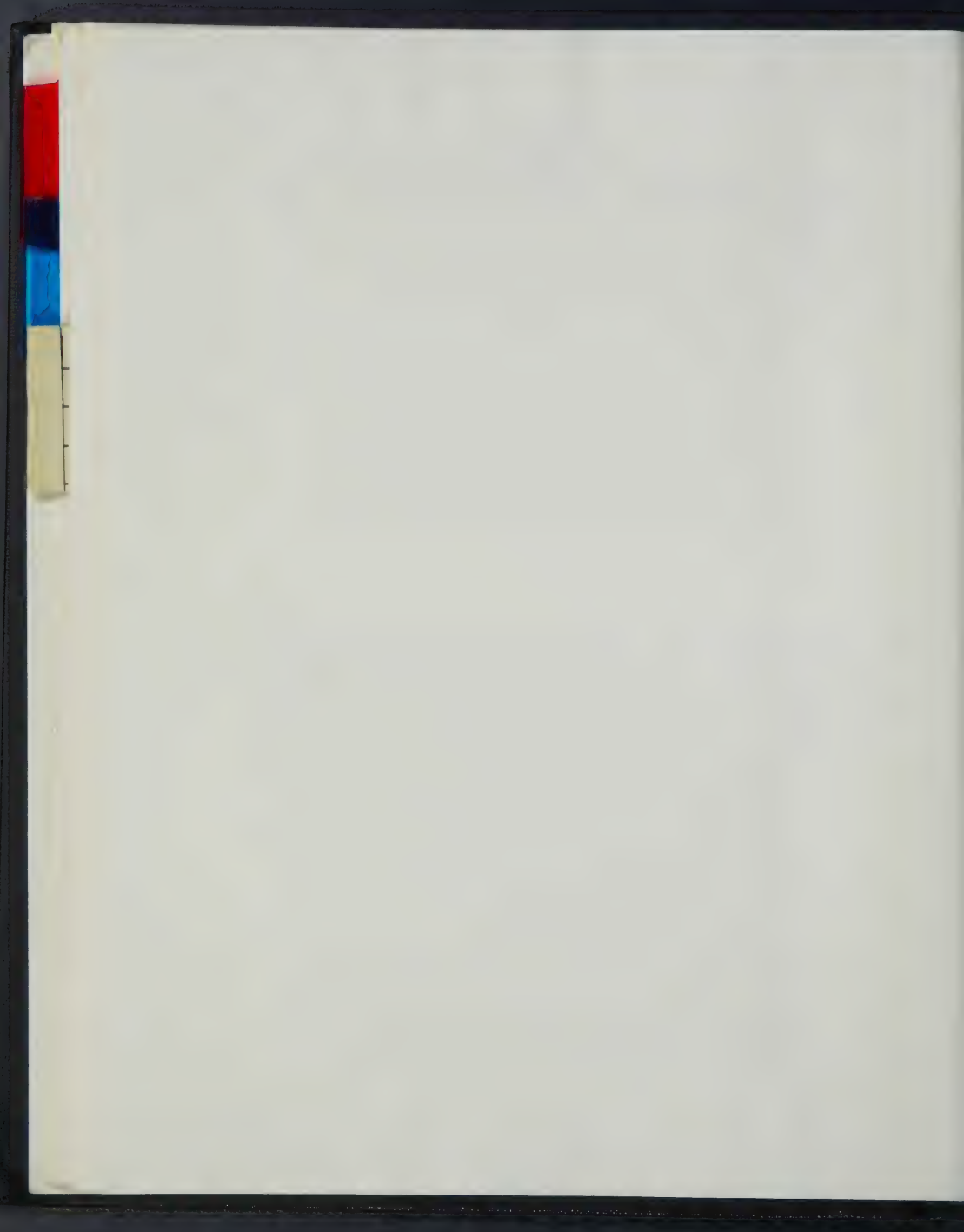
Kr - Max.

Sts - Mand.

ID - Max.

ID - Mand.





Kt - Max.

Sts - Mand.

Kt - Max.

Sts - Mand.

Sts 53

Occluso-lingual view of the left M^1 , M^2 and M^3 in the palate.

Attritional wear on M^1 is severe, exposing the dentine. Attrition is moderate on M^2 and slight on M^3 . The talon portion of M^3 displays a series of distal tubercles. The Carabelli trait is not evident on M^1 or M^2 , but is seen as a series of vertical grooves on M^3 .

Scale in centimetres.

Sts 61

Radiograph of an isolated right M^1 taken in a mesio-distal axis. The mesio-buccal and disto-buccal roots are superimposed, while the single lingual root projects to the right. The large pulp chamber is of meso-taurodont form, and projects moderate pulp horns into the buccal and lingual sets of cusps. These sets of cusps are separated by a deep midline fissure.

Magnification: approximately 3x.

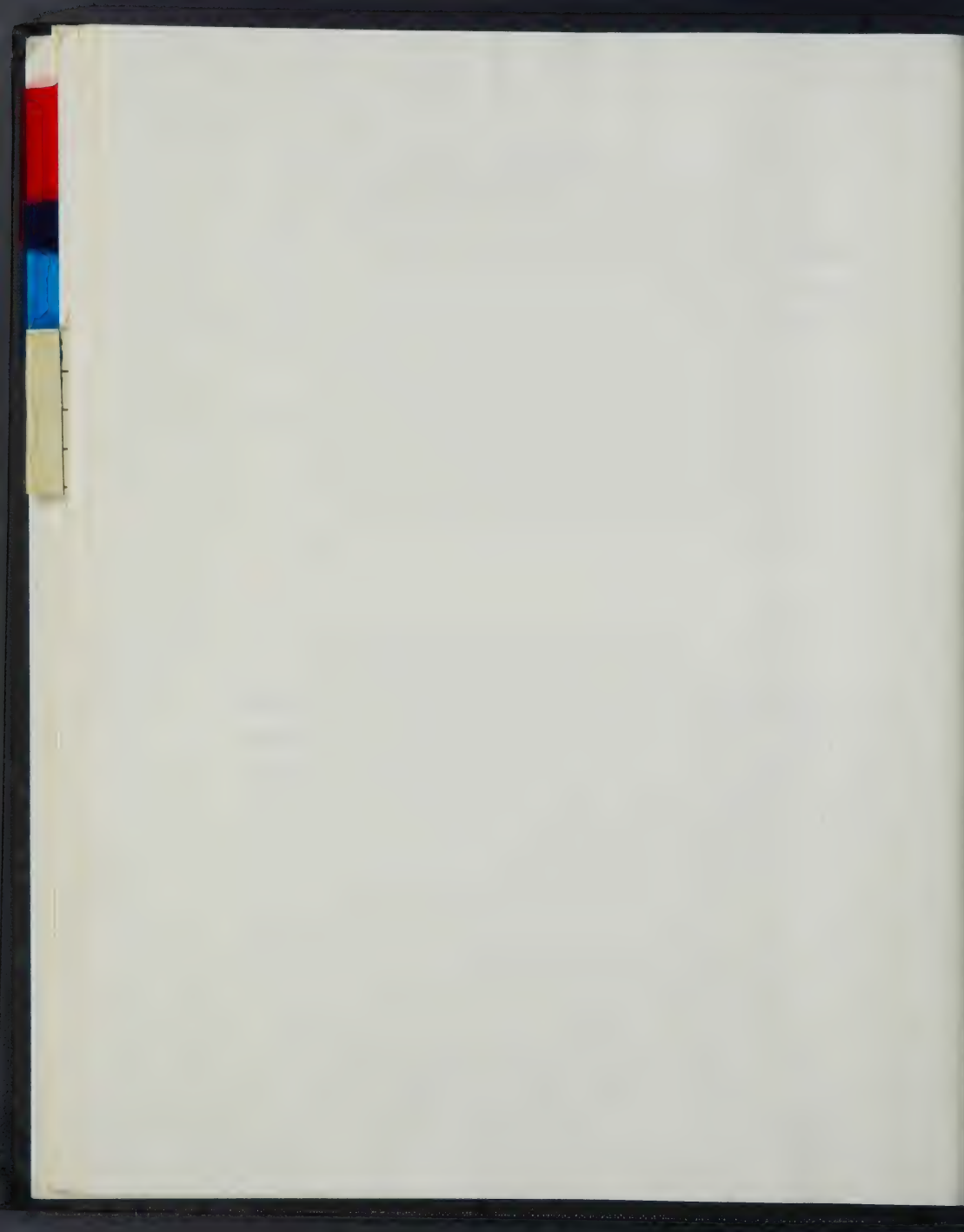
Kr - Max.

SK (Hom) -
Sts - Mand.

LD - Max.

197 - 1971





Kr - Max.

Sts - Mand.

LD - Max.

LD - Mand.

Sts 54

Radiograph of an isolated right M³ displaying an angled attritional facet on the mesio-occlusal surface of the crown.

The enormous thickness of the coronal dentine is noteworthy, resulting in a reduced pulp chamber that appears to contain a calcified pulp stone in its centre. A pulp horn filled with secondary dentine is seen to project into the worn mesial cusps of the tooth.

Magnification: approximately 3x.

Sts 55

Radiograph taken in the M-D plane of the P³ (R). The high peaking of the dentine into the buccal and lingual cusps is evident, as is the bulging of the dentine at the cervical margin. The enamel diminishes to a knife edge at the cervical margin, covering the bulging dentine. Fracture of the roots has destroyed much of the pulp chamber outline, but the shadows of two root canals are evident in the buccal root (right).

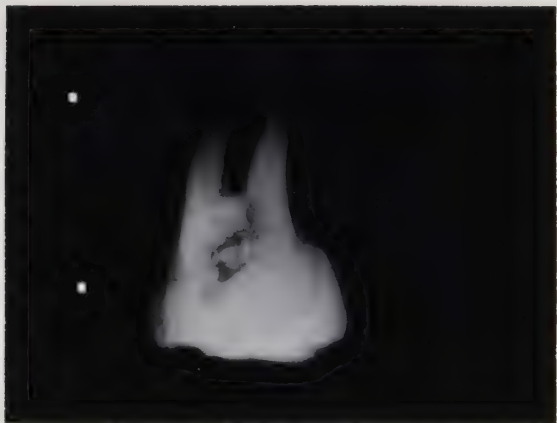
Magnification: approximately 3x.

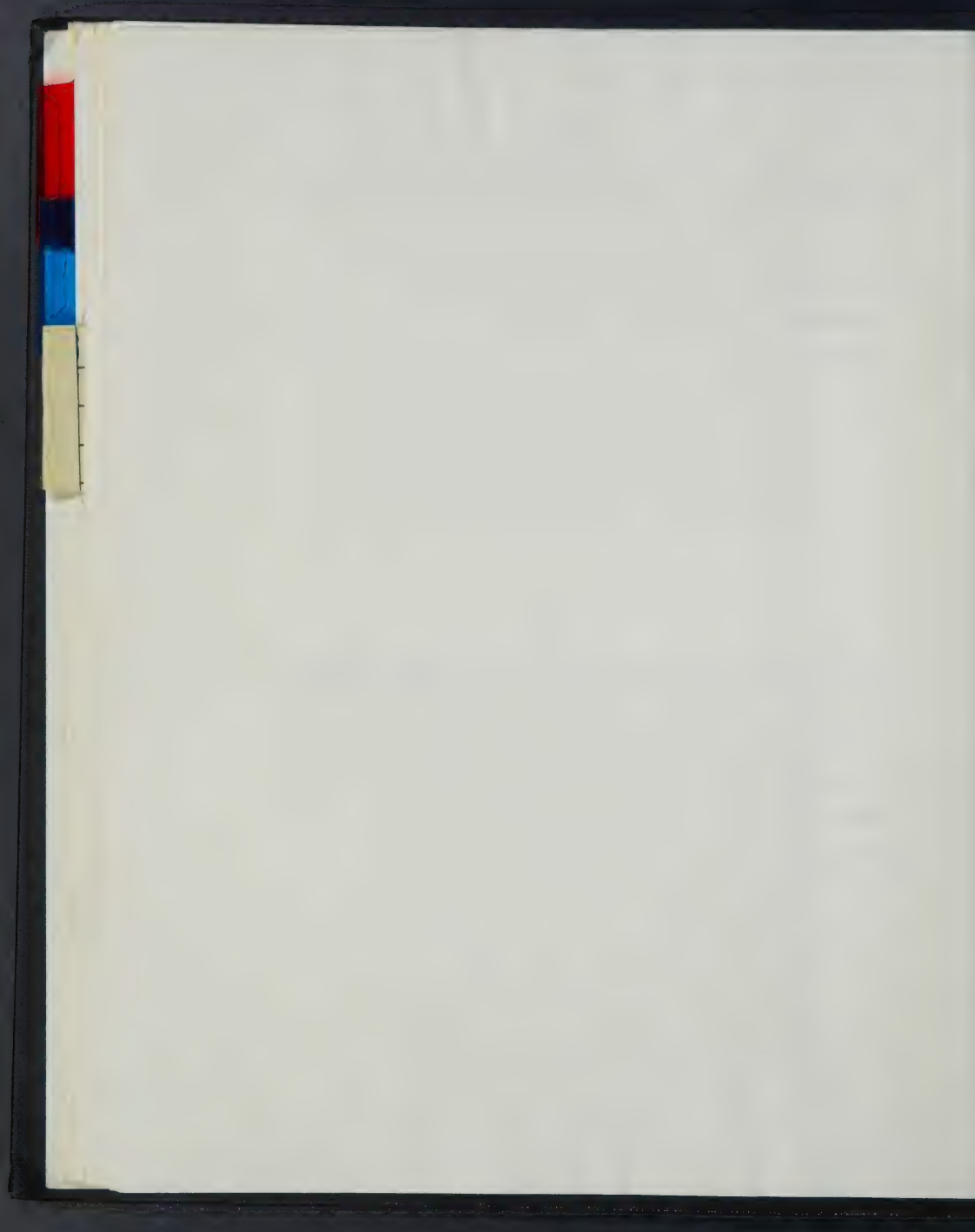
Kr - Max.

Stk (Horn) - Mand.

M.D. - Max.

M.D. - Mand.





KE - Max.

SES - Mand.

RD - Max.

RD - Mand.

Sts 55

Buccal aspect of P^3 (R).

The deep grooving on the disto-buccal aspect of the buccal root has resulted in its bifurcation at the apex.

The crown bulges markedly from the root at the cervical line. The disto-buccal groove (left) is clearly evident, in contrast to the very shallow mesio-buccal groove.

Scale in centimetres.

Sts 27

Radiographs of isolated P^3 (left) and C (right) crowns. The incomplete formation of their roots indicates their derivation from children. Fragments of bone are seen adhering to their pulp chambers.

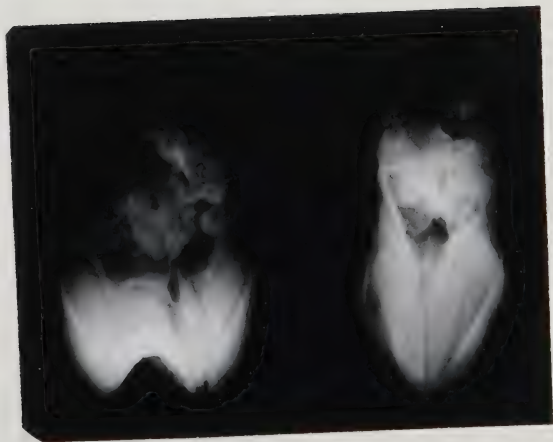
Magnification: approximately 3x.

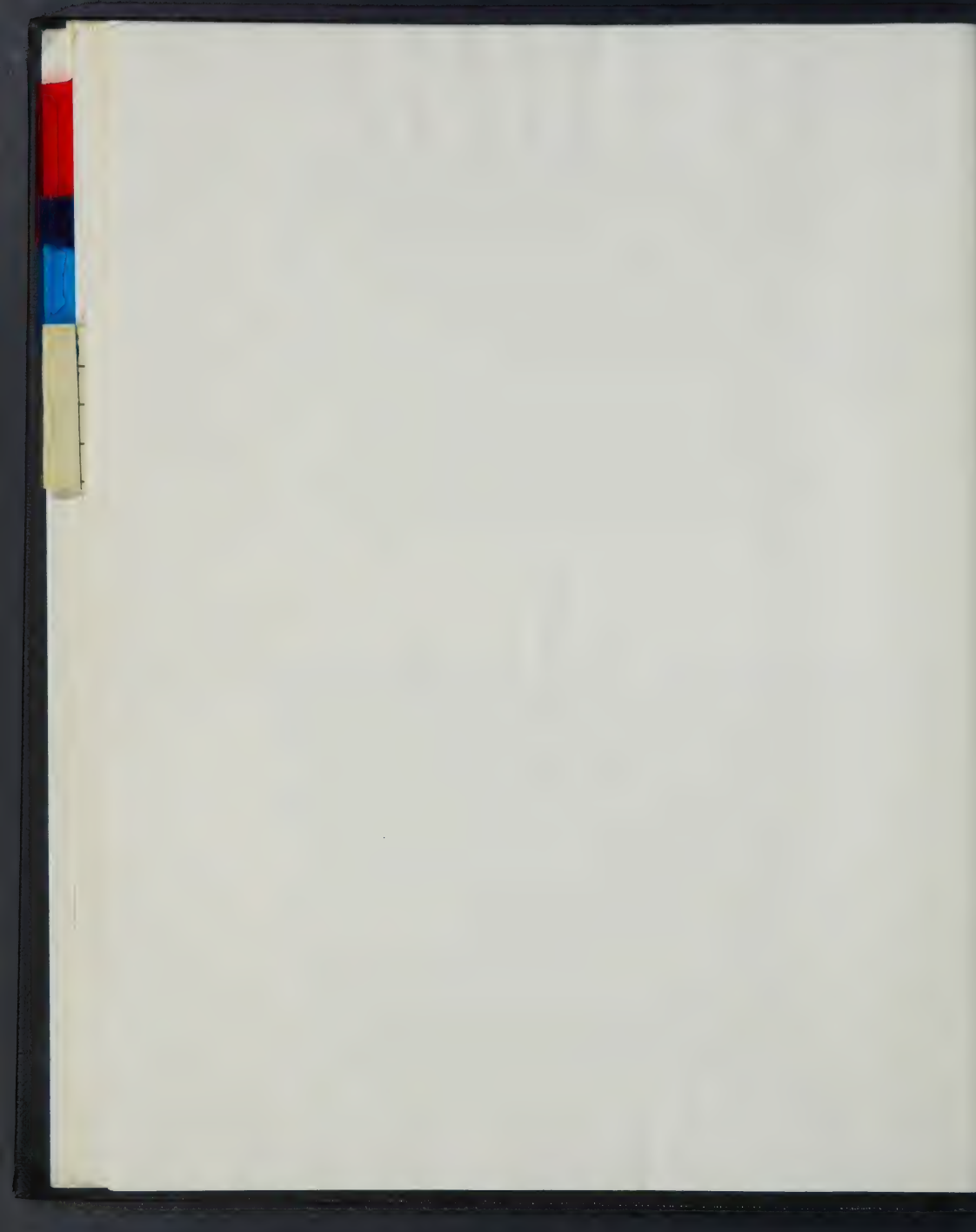
Ke - Max.

Sts - Mand.

UD - Max.

Sts - Mand.





Kr - Max.

Sts - Mand.

MD - Max.

MD - Mand.

Radiograph of a fragment of the left maxilla of a child containing the incomplete crowns of P^3 , P^4 and a portion of M^2 , and the newly erupted crown of M^1 . The roots of M^1 appear to be incompletely formed. The great thickness of the dentine of the M^1 crown is noteworthy, and the superimposition of its buccal and lingual cusps creates the multicusped appearance. The M^1 pulp chamber is seen to be hypotaurodont in form. A vertical fracture line traverses the M^1 crown.

Magnification: approximately 3x.

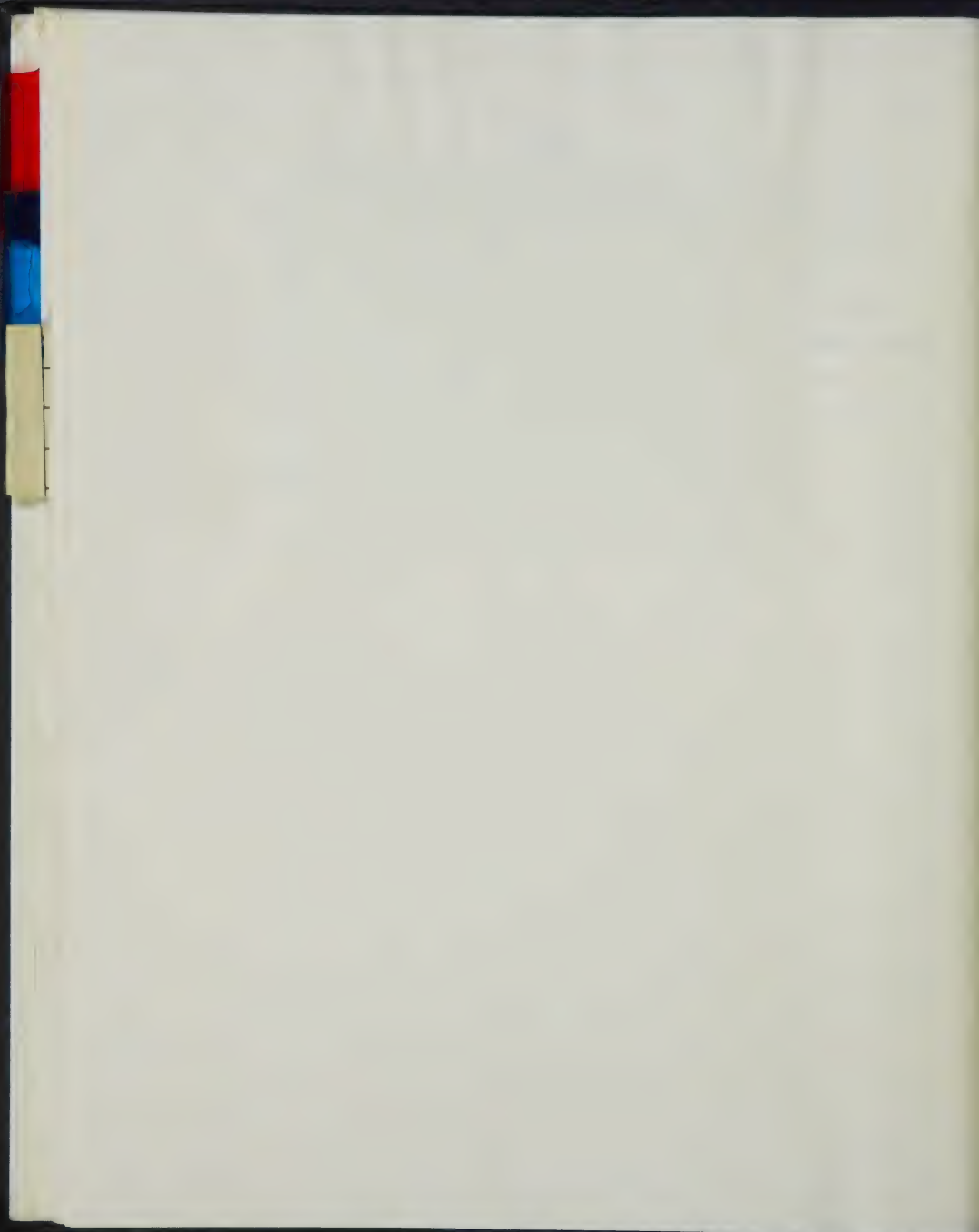
Kt - Max.

SK (Hon) -
Sts - Mand.

LD - Max.

Sts - Mand.





Kr - Max.

SK (Hon) -
Ses - Mand.

UD - Max.

UD - Mand.



STERKFONTAIN

Mandibular Teeth

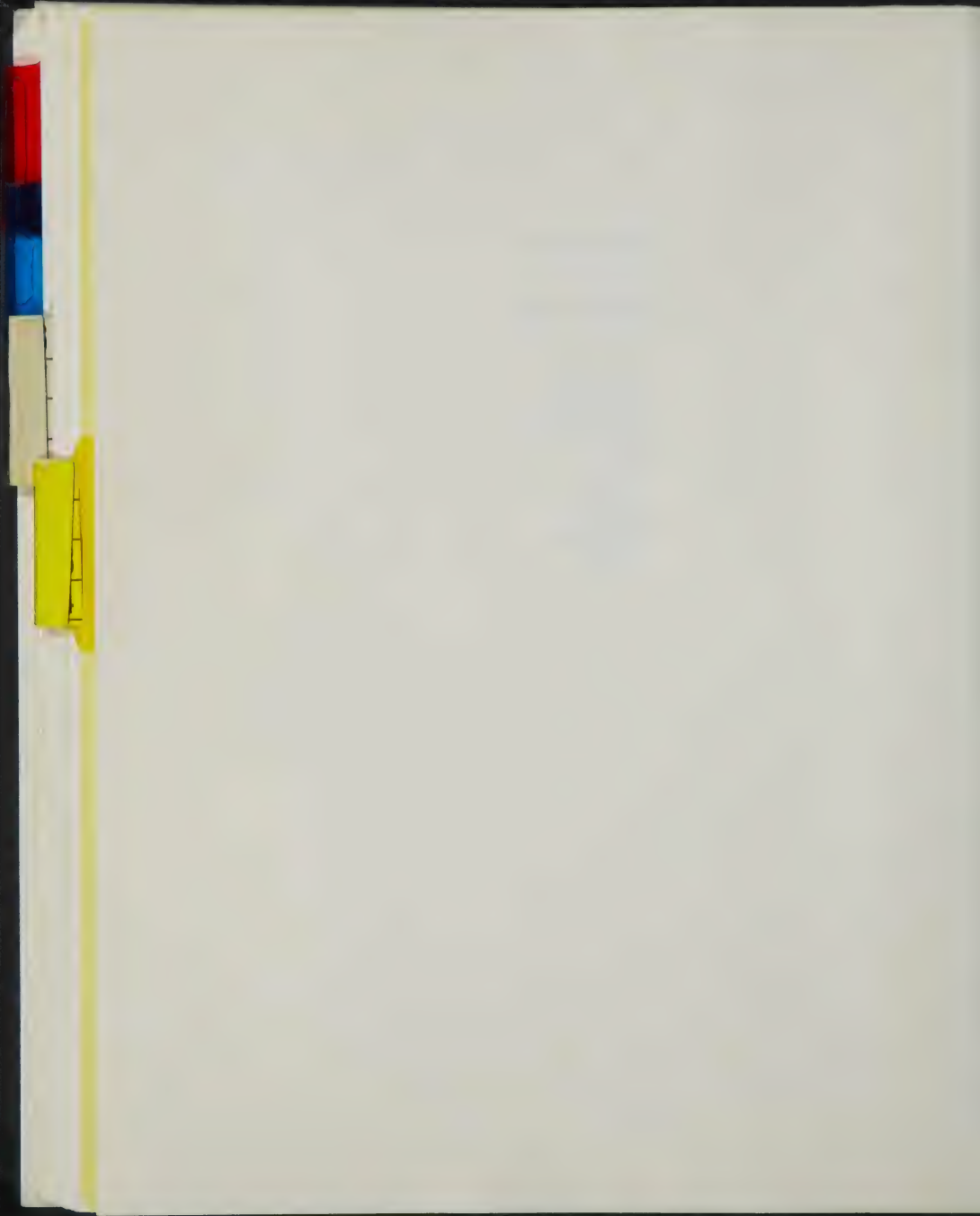
TM 1518
TM 1519
TM 1520
StW Hom 3/69
Sts 4
Sts 9
Sts 18
Sts 51
Sts 52(b)
Sts 59

Ke - Max.

Sts (Hom) -

M.D. - Max.

Sts - Max.



Kr - Max.

SK (Horn) -

MLD - Max.

CD - Max.

TM 1518

(Sterkfontein)

Radiograph of an isolated right M_3 revealing a mottled radiolucency in much of the crown of the tooth reflecting its ? decalcification. The outline of the pulp chamber is somewhat fuzzy, is of mesotaurodont form, and appears to contain calcified pulp stones. A fairly wide "body" between the crown and roots reflects its taurodont form. The root canals are seen to be solidly calcified.

Magnification: approximately 3x.

TM 1519

(Sterkfontein)

Radiograph of an isolated right M_3 embedded in a fragment of mandible. The occlusal surface of the crown is seen to be fairly worn. The considerable occlusal surface thickness of the dentine contrasts markedly with the thin mesial and distal dentine walls of the pulp chamber. The pulp chamber, of limited height and with widely splayed root canal origins, is of cynodont form. The thickness of the periodontal membrane, seen as a radiolucent line between the roots and alveolar bone, is discernible at a few locations. The trabeculation of the bone is clearly seen.

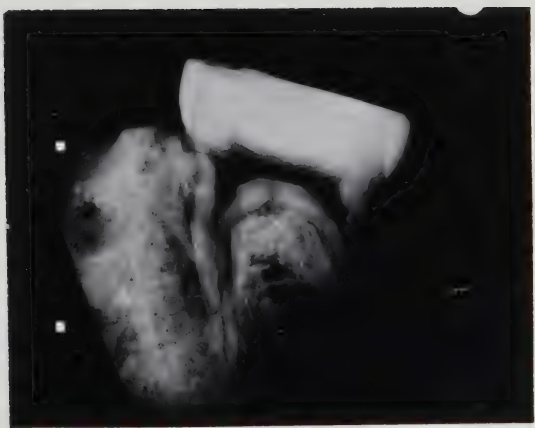
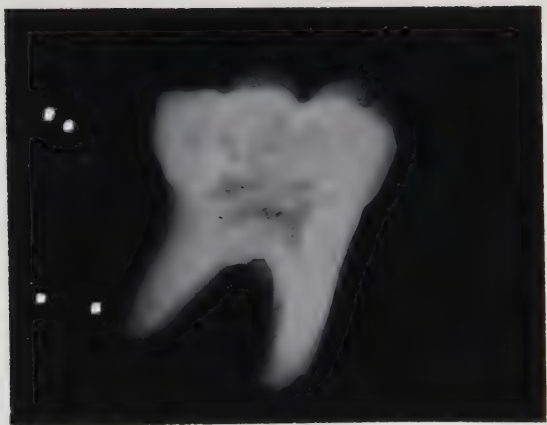
Magnification: approximately 3x.

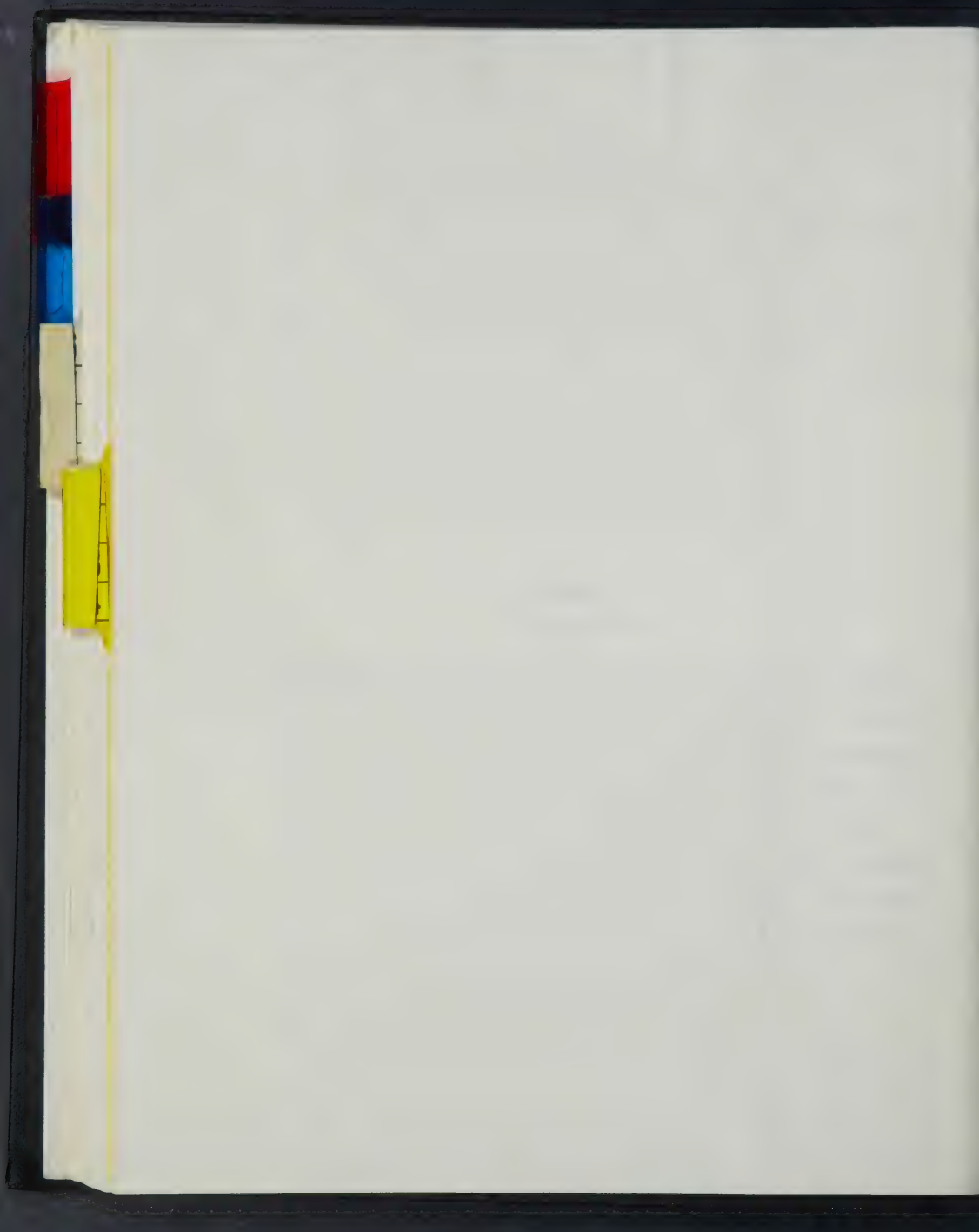
Kc - Max.

SK (Ham) - Max.

MLD - Max.

MLD - Mand.





Ke - Max.

SK (Hom) -

MLD - Max.

ED - Max.

TM 1520

(Sterkfontein)

Radiograph of an isolated left M_3 embedded in a fragment of mandible. The occlusal surface of the crown is seen to be moderately worn. The pulp chamber is seen to be remarkably attenuated, and of extreme cynodont form. The thickness of dentine surrounding the pulp chamber is accordingly great. The root canals appear to be occluded by calcification. No periodontal membrane space between root and bone can be seen.

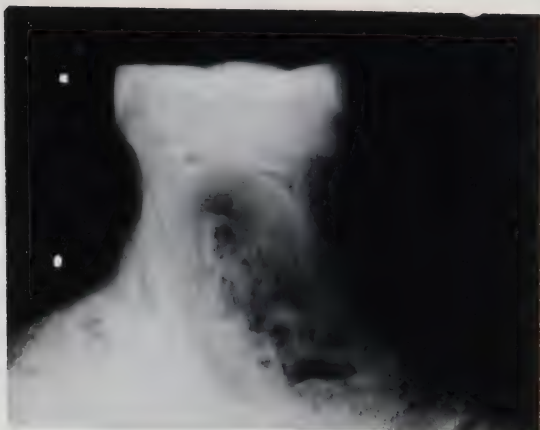
Magnification: approximately 3x.

St W Hom 3/69

Radiograph of an isolated left M_2 or M_3 . The buccal and lingual cusp apices create a multicusped effect. The pulp chamber is seen to be greatly attenuated, and of extreme cynodont form. The root canals are generally occluded.

Magnification: approximately 3x.

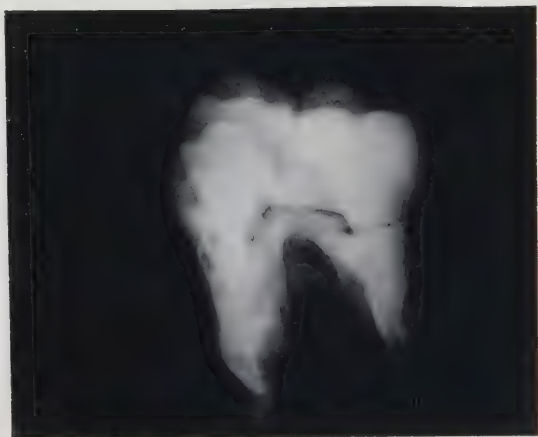
Kr - Max.

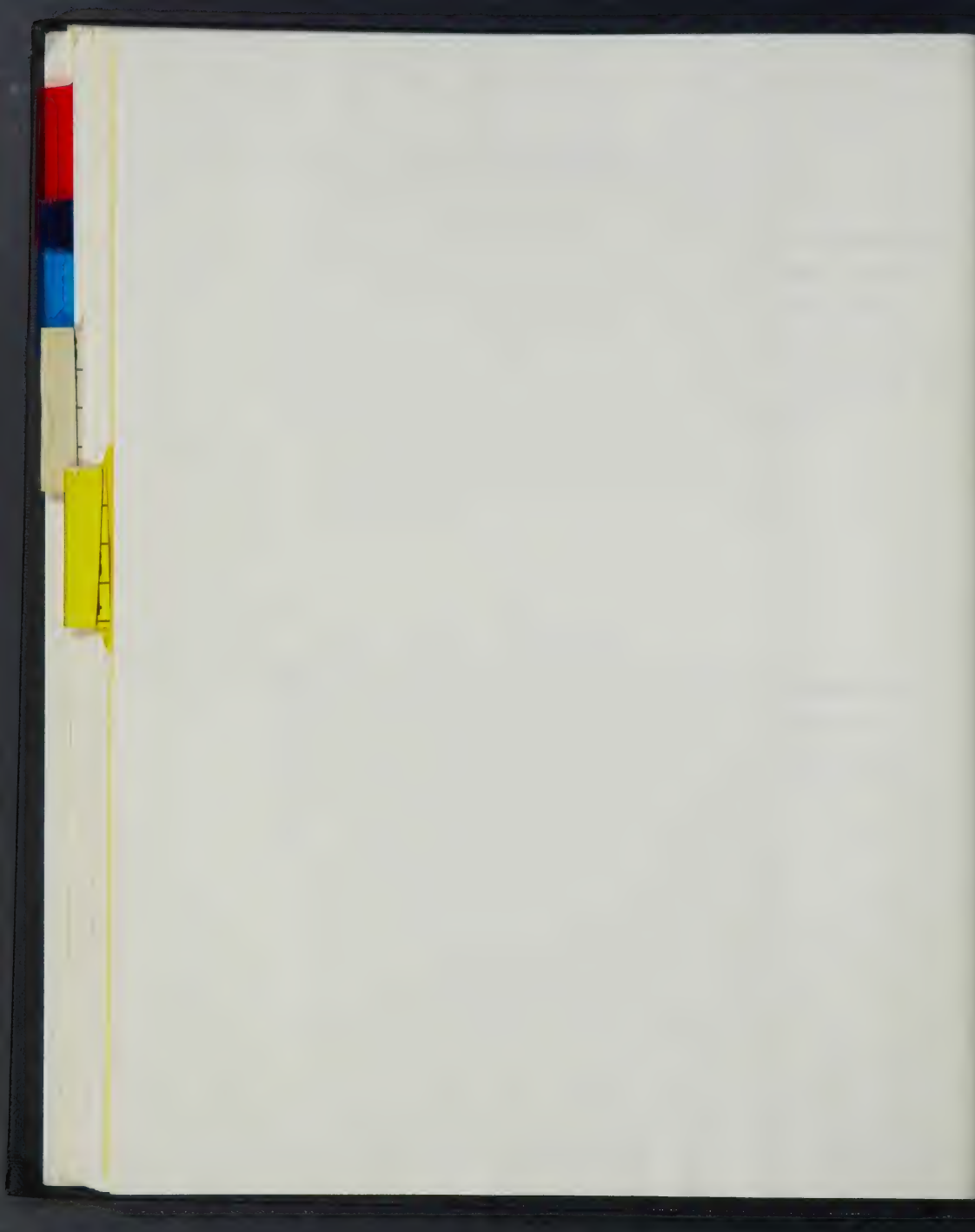


SK (Horn) - Mand

WLD - Max.

SK - Mand





Kr - Max.

SK (Horn) -

MLD - Max.

EX - Max.

Sts 4

Radiograph of an isolated (?left) M_2 revealing a remarkably clear outline of its pulp chamber. A pulp horn, filled with secondary dentine is seen projecting from the mesial aspect of the pulp chamber. The pulp chamber is of hypotaurodont form.

Attritional wear facets are seen on the mesial and occlusal surfaces of the crown. A major portion of the roots is broken off.

Magnification: approximately 3x.

Sts 9

Radiograph of an isolated right M_1 attached to a bone or breccia fragment that fills and obscures its pulp chamber. Numerous fractures are seen to traverse the crown, whose unworn buccal and lingual cusps are superimposed to create the multicusped effect.

Magnification: approximately 3x.

Kr - Max.

SK (Hom) -

MLD - Max.

NO - Max.



Kr - Max.

SK (Horn) - 1

M.D. - Max.

D.D. - Max.

Sts 18

Occlusal view of left and right M_1 's contained in a densely petrified fragment of mandible. Deep grooves are seen on the buccal aspect of the M_1 's separating the protoconid, hypoconid and hypoconulid.

Moderate sized protostylids are seen on the mesio-buccal aspect of the protoconids of the antimeres.

Scale in centimetres.

Radiograph of right M_1 whose roots are embedded in the densely radio-opaque mandible. Details of the pulp chamber are obscured. The outline of part of the M_2 crown is discernible.

Magnification: approximately 3x.

Kr - Max.

SK (Horn) - Max.

MJD - Max.

MJD - Mand.



Kc - Max.

SK (Hom) - M

NLD - Max.

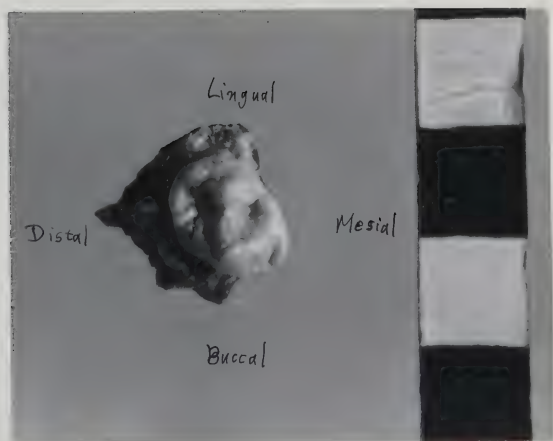
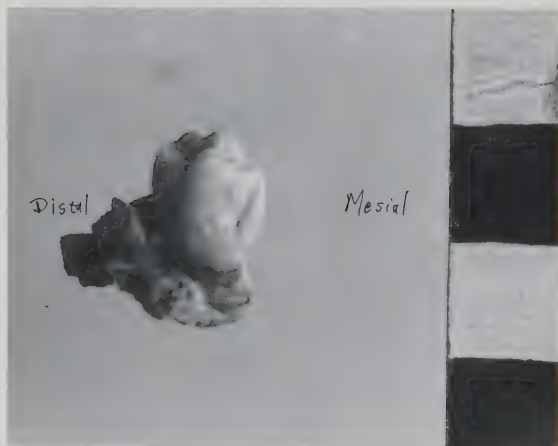
Sts 51

The buccal face of the P_3 (R) shows the high peaking of the buccal cusp and lingual cusp and the deep mesio-buccal groove (right) terminating in a pit. The disto-buccal groove is shallow and does not sharply demarcate the talonid.

Scale in centimetres.

Sts 51

The occlusal surface of the P_3 (R) showing the buccal cusp below and the lingual cusp above joined by their fused triangular ridges ^{which} separate the mesial (right) and the distal (left) fossae. The tooth is slightly distorted, the buccal cusp bulging conspicuously mesially. A deep mesio-buccal groove terminates in a pit. The talonid (left) is only slightly demarcated by occlusal grooves, and its enamel is thrown into slight folds.



Kr - Max.

SK (Hom) -

MID - Max.

MD - Max.

Kr - Max.

SK (Hom) - 1

MLD - Max.

MLD - Max.

Sts 52(b)

View of occlusal surfaces of mandibular teeth reveals a gradation of occlusal attritional wear of molars. The buccal aspects of the teeth of the left side are seen to be badly damaged and the anterior teeth much fractured.

Scale in centimetres.

Sts 52(b)

The buccal aspect of the fractured left \bar{C} , P_3 , P_4 and M_1 and the intact M_2 reveals much of their coronal morphology. The pulp chambers of the fractured teeth are evident, and the thickness of their enamel and dentine is revealed. The undulating contour of the enamel of the protoconid of M_2 is noteworthy.

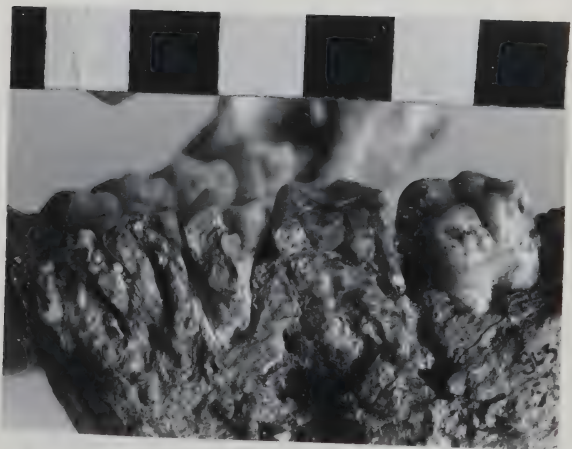
Scale in centimetres.

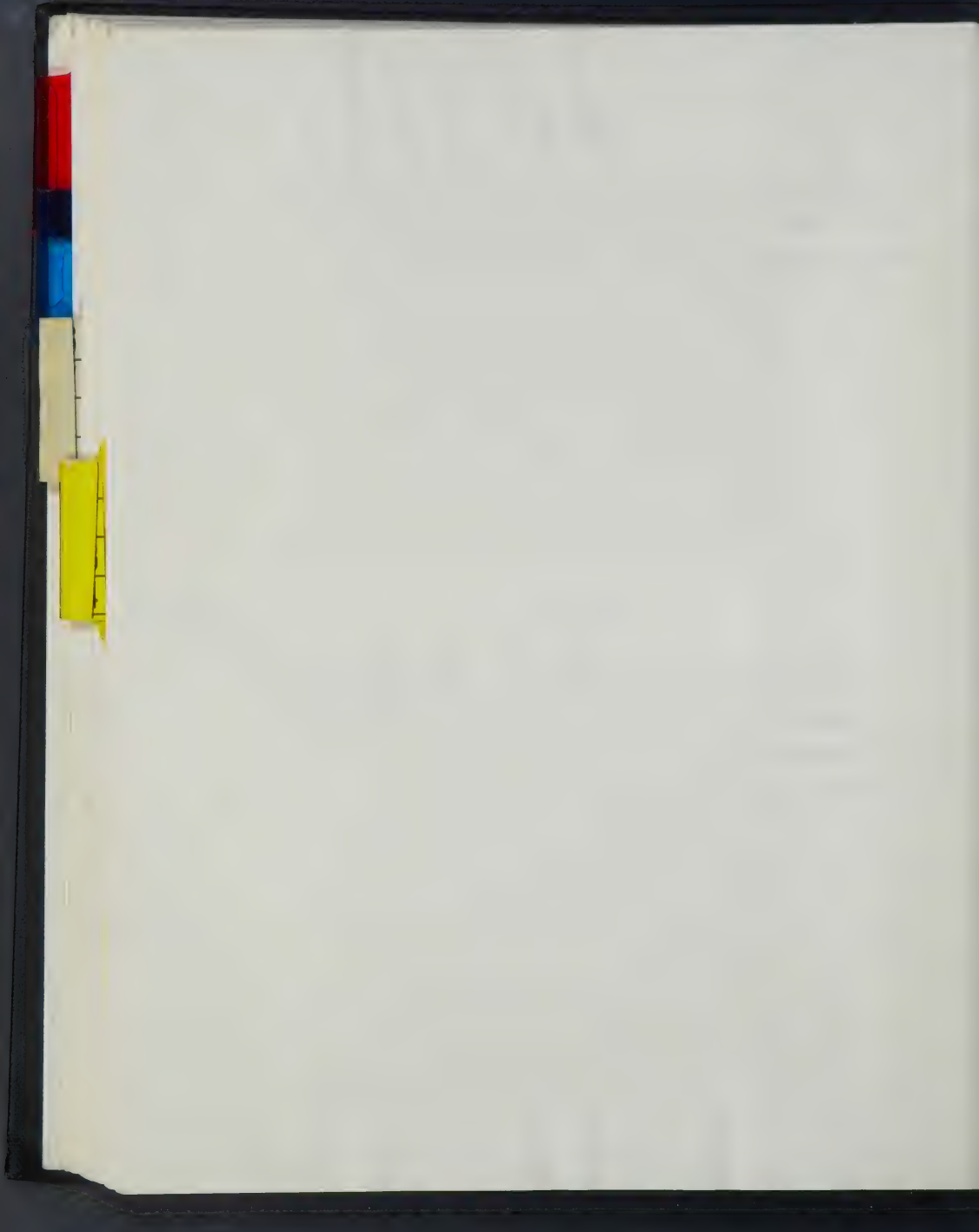
Kc - Max.

SK (Hom) - Mand

MLD - Max.

MLD - Mand.





Kr - Max.

SK (Hon) -

Max

MLD - Max.

MLD - Max.

Sta 52(b)

Buccal aspect of right mandible reveals the characteristic vertical grooving of the premolars and the peculiarly buccally inclined occlusal attritional wear of M_1 . The amelo-cemental cervical marginal line of the molars is seen to be straight.

The multiple mental foramina beneath the premolars is a noteworthy feature of the mandible.

Scale in centimetres.

Kr - Max.

SK (Hem) - Mand

MLD - Max.

MLD - Mand.



KC - Max.

SK (Hon) -

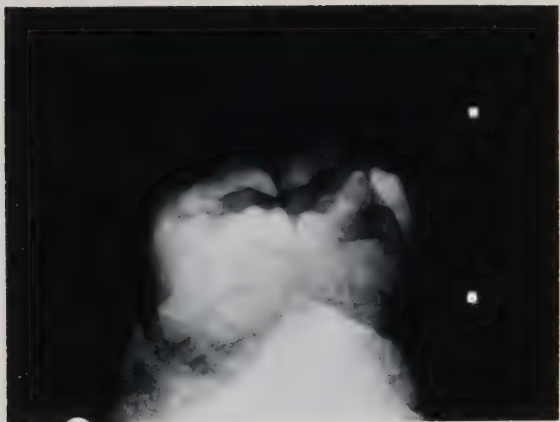
MLD - Max.

ED - Max.

Sts 59

Radiograph of left M_3 embedded in breccia that obscures its roots. Heavy petrification has obscured the pulp chamber. The occlusal surface is intact despite the "broken" appearance presented in the radiograph.

Magnification: approximately 3x.



Kr - Max.

SK (Hein) - Mond

MD - Max.

MD - Mond

Kf - Max.

SK (Hom) - M

NLD - Max.

MD - Max.

MAKAPANSGAT

Maxillary Teeth

MLD 6

MLD 9

MLD 28

Kr - Max.

SK (lion) - Mand.

MLD - Mand.

Kc - Max.

SK (Hon) - Mand.

SK - Mand.

MLD 6

Radiograph of the right maxilla from the palatal aspect, containing P^4 , M^1 and M^2 in situ. Dense petrification characterizes this specimen, obscuring details of the pulp chambers and roots of the teeth. The very faint outlines of the M^1 pulp chamber and root canals may be discerned, revealing them to be apparently of cynodont form.

Magnification: approximately 3x.

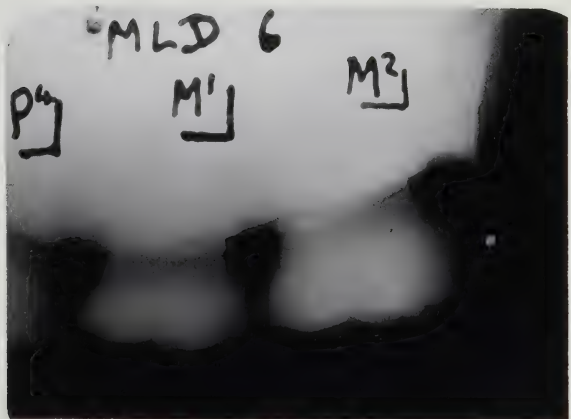
Radiograph of the right maxilla from the buccal aspect, containing P^4 , M^1 and M^2 in situ. Dense petrification obscures all details of pulp and root morphology. The "collars" surrounding the cervical areas of M^1 and M^2 are believed to be x-ray artifacts.

Magnification: approximately 3x.

Kr - Max.

SK (Horn) - Mand.

MLD - Mand.



Kt - Max.

SK (Hom) - Mand.

MD - Mand.

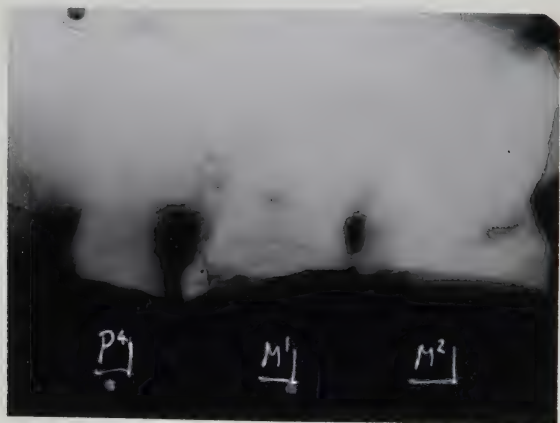
Radiograph of the right maxilla with P⁴, M¹ and M² in situ. Extremely severe attritional wear is evident, that has greatly reduced the crowns of the teeth. Dense petrification of the zygomatic arch obscures the apices of the roots of the teeth. The faint outlines of the pulp chambers reveals their considerable attenuation and cynodont form.

Magnification: approximately 3x.

Kr - Max.

SK (Hom) - Mand.

400 - Nord.



Kr - Max.

SK (Hom) - Mand.

400 - Mand.

MLD 28

Radiograph of the right M^2 and M^3 from the buccal aspect, held in a fragment of maxilla. The occlusal surface of the M^2 crown is moderately worn, and that of M^3 slightly so. The lack of demarcation between enamel and dentine creates the enormously thick occlusal surface wall to the pulp chambers, both of which are of mesotaurodont form. The root canals can be faintly seen, but the outlines of the roots are very vague. Some trabeculation of the bone can be discerned.

Magnification: approximately 3x.

Radiograph of the right M^2 and M^3 from the lingual aspect, held in a fragment of maxilla. The oblique angulation of the x-rays "fills in" part of the pulp chambers, but their square mesotaurodont outlines can be faintly seen on their occlusal walls. Moreover, wide pulp horns are seen to project into the occlusal walls of both teeth.

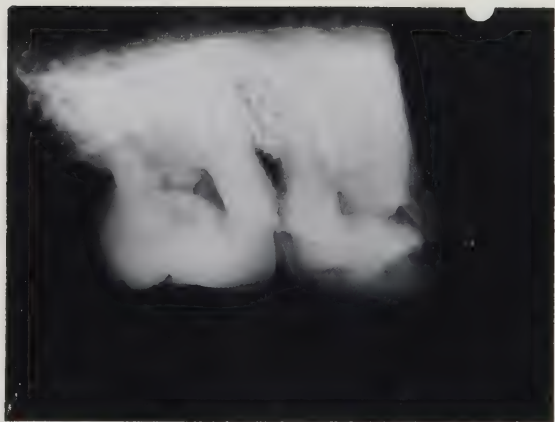
The fragmented nature of M^2 is better seen than in the above radiograph.

Magnification: approximately 3x.

Kr - Max.



SK (Hom) - Mand.



OLD - Mand.

Kr - Max.

SK (Hom) - Mand.

MLD - Mand.

MAKAPANGSAT

Mandibular Teeth

MLD 2
MLD 5
MLD 18
MLD 19
MLD 40

Kr - Max.

SK (Hom) - Mand.

Kr - May.

SK (Hom) - Mand.

MLD 2

Oblique view of the mandible of an adolescent containing a single deciduous molar (right dm_2) and the permanent cheek teeth. The left P_4 is seen to be just erupting. Large talonids are seen on the P_3 's and the erupting P_4 . The molars display prominent protostylids on the buccal aspect of their protoconids. The M_1 's are slightly worn, while the premolars and M_2 's are newly erupted.

Scale in centimetres.

Kc - Max.

SK (Hom) - Mand.



Kr - Max.

SK (Hon) - Mand.

MLD 2

Radiograph of the left mandible containing the P_3 and M_1 in situ. The clear outline of the pulp chamber and wide root canals of the double-rooted P_3 contrasts strongly with the obscured internal morphology of the M_1 . The alveolar bone is very heavily petrified and obscures the roots of M_1 and evidence of the ^{very poorly} ~~missing~~ P_4 . The radio-opaque "collar" surrounding the crown of M_1 is an artefact.

Magnification: approximately 3x.

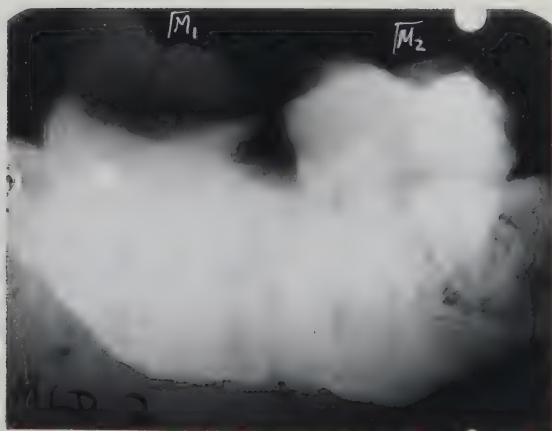
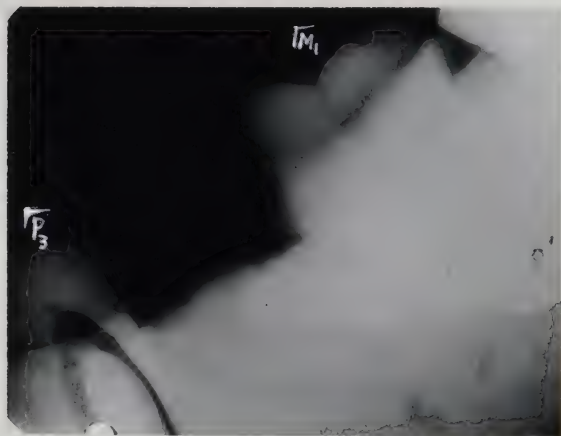
MLD 2

Radiograph of the left mandible containing M_1 and M_2 in situ. The pulp chambers of the molar teeth are all but obscured, and their roots only faintly delineated. Some slight evidence of the trabeculation of the alveolar bone is seen, and variations in its petrification are reflected in the varying degrees of radio-opacity.

Magnification: approximately 3x.

Kr - Max.

SK (Horn) - Mand.





Kr - Max.

SK (Hom) - Mand.

MLD 5

Radiograph of the right dm_2 set in very densely petrified bone that obscures its root outline. The crown appears to project multiple cusplets as a result of superimposition of buccal and lingual cusps. It would appear that some natural resorption of the inter-radicular area of the crown may have occurred ante-mortem, to judge by its radiolucency.

Magnification: approximately 3x.

MLD 18

Radiograph of the right mandible containing the three molar teeth. Dense petrification obscures the distal root of M_2 and the roots of M_3 . Attritional wear of the occlusal surface is seen to be severe on M_1 , moderate on M_2 , and absent from M_3 . The strongly cynodont form of the pulp chambers of M_1 and M_2 is evident, while that of M_3 is obscured.

Magnification: approximately 3x.

Kr - May.

SK (Hom) - Mand.



Kr - Max.

SK (Hom) - Mand.

MLD 18

Occlusal view of the right mandibular fragment containing all the anterior and right cheek teeth in situ. Considerable attritional wear has exposed secondary dentine on the anterior teeth. Gradation of occlusal attritional wear from the most on M_1 to the least on M_3 is evident. The predominant size of M_2 over the other two molars is evident. The M_3 alone retains evidence of its occlusal fissure pattern.

Scale in centimetres.

MLD 18

Radiograph of the right mandible with all the cheek teeth in situ. P_3 is seen to be double-rooted, while P_4 appears to be single rooted. The occlusal surface of the crown of M_1 is seen to be severely worn, and the outline of its pulp chamber is of cynodont form. The mesial root of M_1 appears to contain an unusual double root canal.

Magnification: approximately 3x.

Kr - Max.

SK (Hom) - Mand.



Kr - Max.

SK (Ham) - Mand.

MLD 19

Radiograph of the left M_3 contained in a fragment of mandible. The demarcation between enamel and dentine is evident, revealing a very thick supra-pulpal dentine layer. The outline of the roots is not entirely clear, but the pulp outline is very well demarcated, revealing its cynodont form. A prominent mesial pulpal horn is evident, and the root canal reveals the very slight curve of the mesial root.

Magnification: approximately 3x.

Kr - Max.



SK (Hom) - Mand.

Kr - Max.

SK (Hom) - Mand.

MLD 40

The left side of the mandible containing all the cheek teeth in situ. The crowns of the \bar{C} and M_3 are broken off, and the other four teeth display considerable attritional wear. The discrepancy in the sizes of the crowns of the M_1 and M_2 is striking. The outline of the pulp chamber of M_3 is evident.

Scale in centimetres.

Kr - Max.



SK (Hom) - Mand.

Kc - Max.

SK (Hom) - Mand.

Radiograph of the left mandible containing the cheek teeth in situ. The crowns of P_3 and P_4 are obscured by the heavy radiation required to reveal their root structure. Dense petrification of bone, however, prevents observation of their root form.

Considerable attritional wear is evident on the occlusal surfaces of the teeth, providing for their sharply demarcated outlines. The pulp chambers of the teeth can be vaguely discerned, but cannot be characterized.

Trabeculation of the alveolar bone is well depicted.

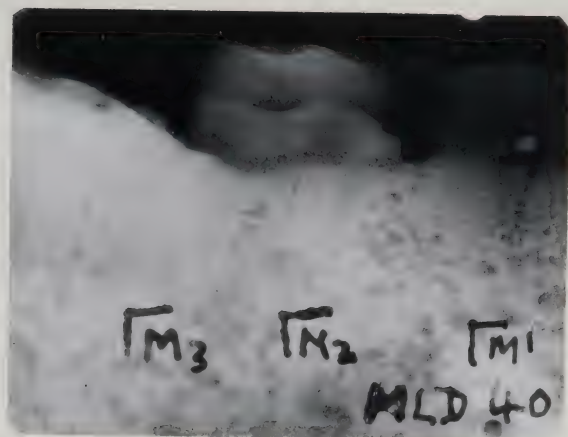
Magnification: approximately 3x.

Radiograph of the left mandible containing the molar teeth in situ. The ascending ramus of the mandible largely obscures the M_3 . The buccal and lingual cusps of M_2 create a double-layered effect in the crown of the tooth, while the crown of M_1 is greatly obscured by heavy radiation.

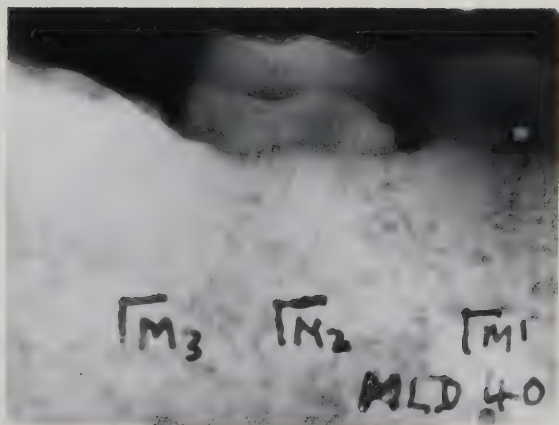
Neither pulp chambers or roots of the teeth can be clearly discerned in this radiograph, but the pattern of bone trabeculation is evident.

Magnification: approximately 3x.

It - Max.



SK (Hom) - Mand.





Kr - Max.

SK (Hom) - Mand.

KROMDRAAI

Maxillary Teeth

TM 1517

TM 1601

SK (Hom) - Mand.



TM 1517(a)

(Kromdraai)

Radiograph of the left maxilla containing P^3 , P^4 and M^1 in situ. Fracture lines may be seen passing through the cervical areas of all three teeth. The clearly outlined pulp chambers are of mesotaurodont form, and that of M^1 projects prominent pulp horns partially filled with secondary dentine. Both P^3 and P^4 possess mesial and distal roots, while the mesio-buccal and disto-buccal roots of M^1 are discernible, but not its lingual root. None of the root canals is clearly evident.

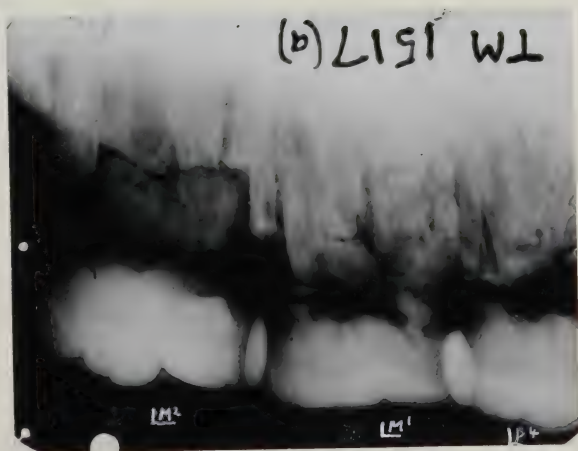
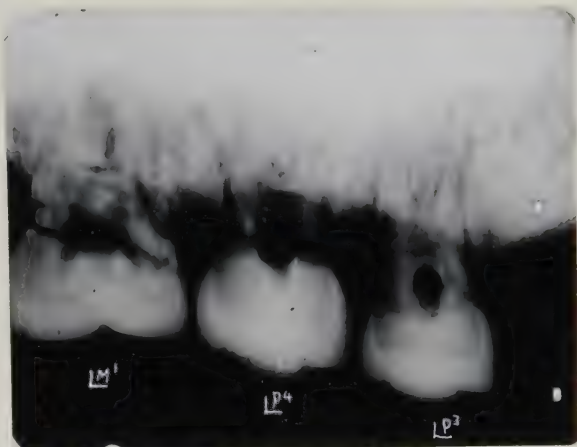
The dense petrification of the alveolar bone all but obscures its trabecular pattern.

Magnification: approximately 3x.

Radiograph of the left maxilla containing P^4 , M^1 and M^2 in situ. The angle of the x-rays superimposes the mesial and distal edges of the teeth, creating the double-edged effect. The mesotaurodont pulp chamber of M^1 is clearly outlined, but that of M^2 is indeterminate. Only parts of the roots are discernible, primarily because of their radiolucent root canals. The oval outline of the pulp chambers of P^3 and P^4 is a peculiarity found also in the premolars of SK 65 and TM 1511 from Sts (vide).

The worn occlusal surface of M^1 contrasts with the pristine cusp peaks of M^2 .

Magnification: approximately 3x.



CC - Mand.

SK - Max.

SK (Hon) - Mand.

TM 1601

(Kromdraai)

Radiograph of an isolated dm and a fragment of a left M^1 crown. The dm displays the typically widely splayed roots of a deciduous molar, and its unworn cusps are superimposed to create a multi-peaked effect. The dm's pulp chamber contains radio-opaque material, possibly reflecting antemortem calcification of the pulp or breccia intrusion.

Little can be discerned from the M^1 fragment other than its partially superimposed cusp peaks.

Magnification: approximately 3x.

Kc - Mand.

SK - Max.

SK (Hon) - Mand.





Kr - Mand.

SK - Mar.

SK (Hom) - Mand.



KROMDRAAI

Mandibular Teeth

TM 1517

TM 1600

SK - Max.

SK (Hom) - Mand.



SK - Max.

SK (Hom) - Mand.

TM 1517

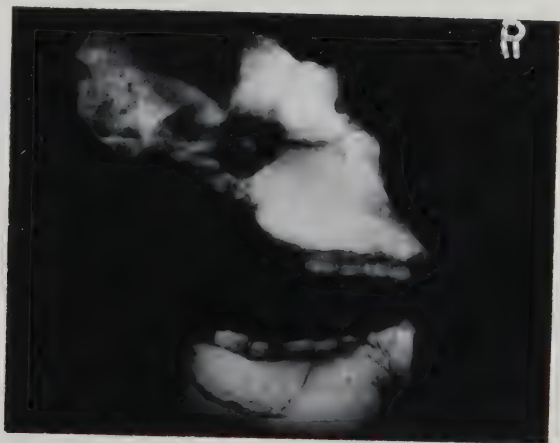
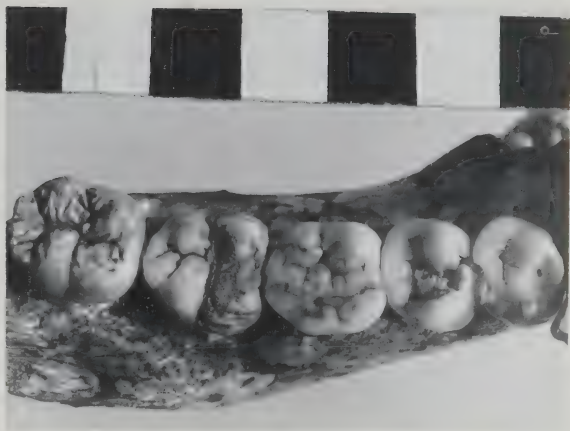
(Kromdraai)

Occlusal surface view of right mandibular cheek teeth. The mesial half of the M_2 has been restored with plaster. Attritional wear is seen to be most marked on M_1 and least evident on M_3 in keeping with their order of eruption. The distal talonids on the premolars are clearly evident. The Y-5 groove pattern is seen on the M_1 and M_3 . The wrinkling of the enamel on the M_3 is noteworthy.

Radiograph depicting the left cranium and maxilla and right mandible. The roots of the maxillary cheek teeth are obscured by dense petrification of the cranium, but the outlines of the roots of the mandibular teeth are clearly evident. The P_4 is seen to be double rooted. The pulp chamber of M_1 is hypotaurodont. The mandibular canal is clearly seen.

SK - Max.

SK (Hom) - Mand.



SK - Max.

SK (Hom) - Mand.

(Kromdraai)

Radiograph from the buccal aspect of the right mandible containing all the cheek teeth in situ. The crown of the \bar{C} is seen to be fractured longitudinally, while the crowns of P_3 and P_4 reflect considerably different degrees of radiodensity. The outlines of the P_3 and P_4 pulp chambers are obscured by radiolucency, while much of the detail of their roots is obscured by the dense petrification of the mandible. It is not clear whether P_3 is double or single-rooted, but P_4 displays mesial and distal roots.

The occlusal surfaces of P_4 and M_1 display a continuous curved attritional wear facet.

Magnification: approximately 3x.

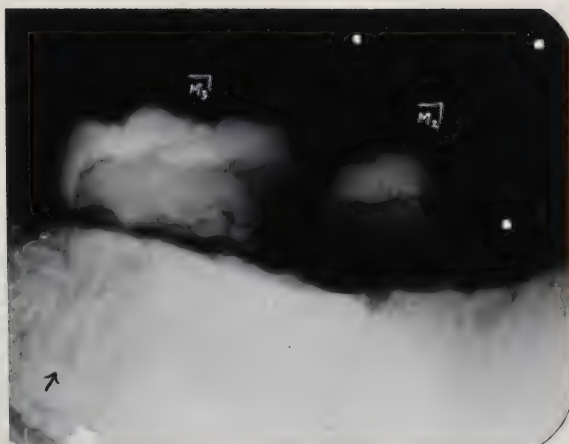
Radiograph from the lingual aspect of the right M_2 and M_3 in situ. The mesial half of the crown of M_2 is seen to be absent, although its mesial root is retained in the mandible. The outlines of the pulp chambers are not clear, but appear to be of hypotaurodont form. While much of the detail of the roots is obscured, the apex of the distal root of M_3 is seen to be open, as evident by a radiolucent area (arrow), indicating the tooth to be that of a young adult. The radiolucent mandibular canal is seen running beneath the arrow.

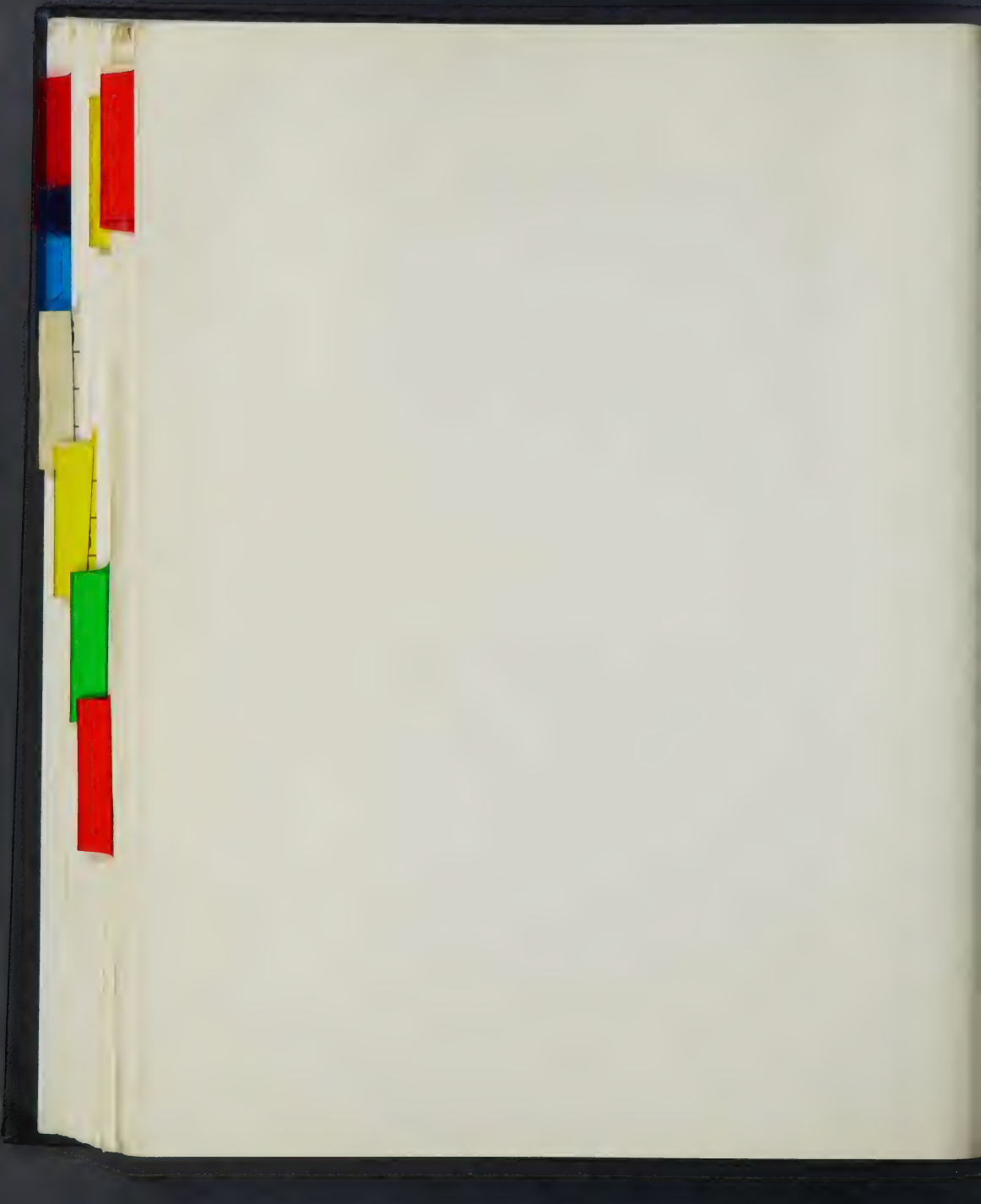
Magnification: approximately 3x.

SK - Max.



SK (Hom) - Mand.





SK - Max.

SK (Hom) - Mand.

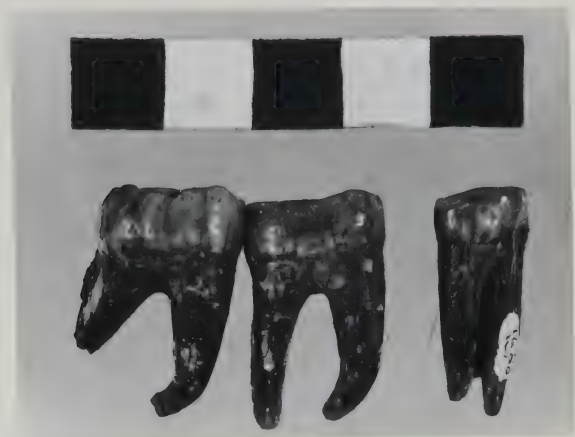
TM 1600

(Kromdraai)

Lingual view of isolated left P_3 , M_2 and M_3 from the same individual. Considerable attritional wear is evident, reducing the height of the crowns of the teeth. The enamel cervical margin on the two molars is seen to be remarkably straight, while the margin on the P_3 undulates from the mesial to the buccal aspects of the tooth.

The distal curvature of the mesial roots of the molars contrasts with their straight distal roots. The double roots of the P_3 (mesial and distal) is a noteworthy feature.

Scale in centimetres.



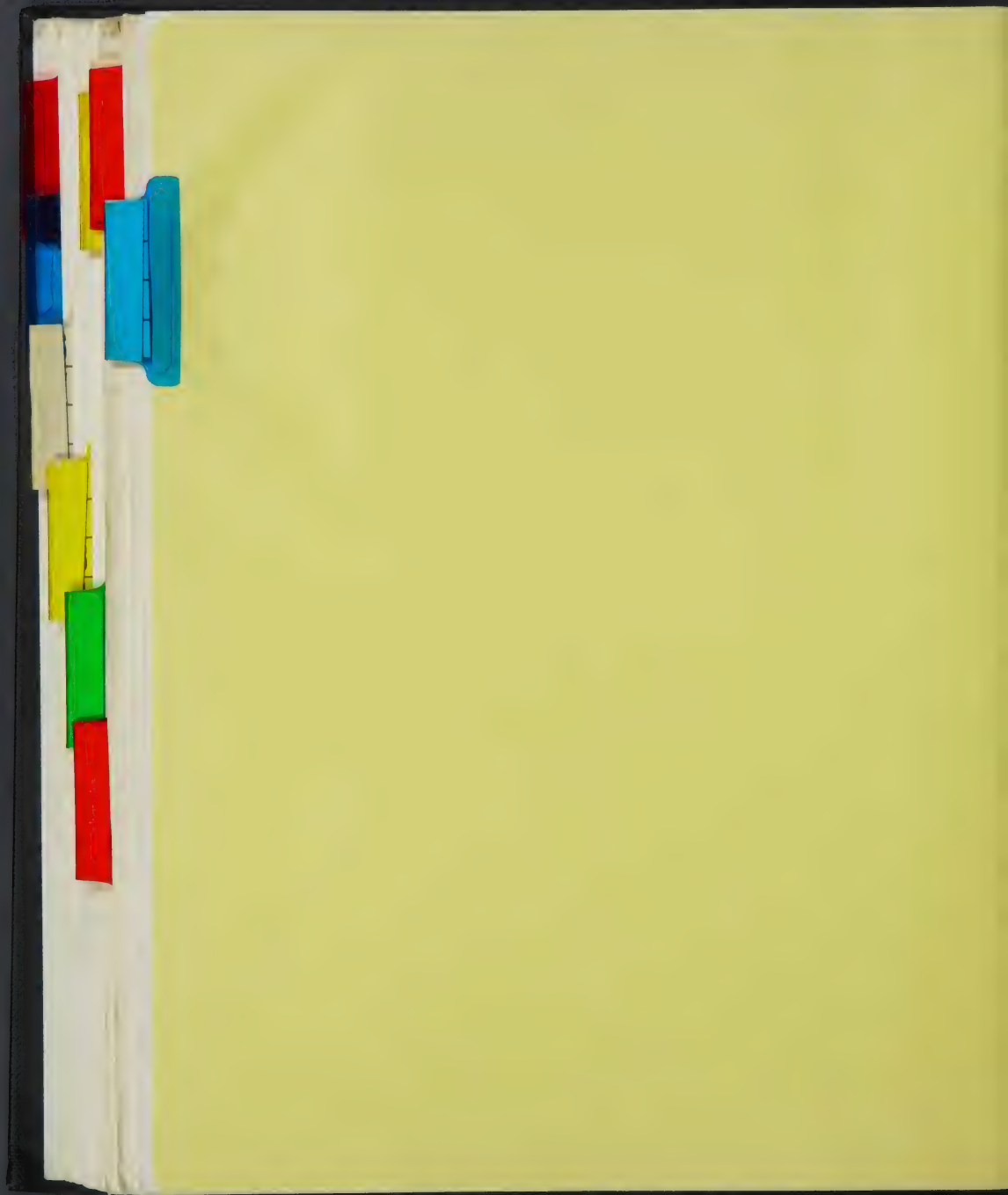
SK - Max.

SK (Hom) - Mand.



SK - Max.

SK (Hom) - Mand.



SWARTKRANS

Phocaena

Maxillary Teeth

SK 11
SK 52
SK 13—
SK 24
SK 14
SK 46
SK 55(a)
SK 61
SK 65
SK 74(c)
SK 79
SK 1400
SK 826(a)
SK 838
SK 877

SK - Mand

SK (Hom) - Mand.



SK - Mand.

SK (Hom) - Mand.

SK 11

Occlusal view of some of the maxillary cheek teeth reveals a fairly marked degree of occlusal and approximal attrition and severe post-mortem fracturing of these teeth. The cusp and fissure patterns have all but disappeared, except on M^2 , and missing portions of the right premolars and M^1 have been replaced by plaster.

Scale in centimetres.

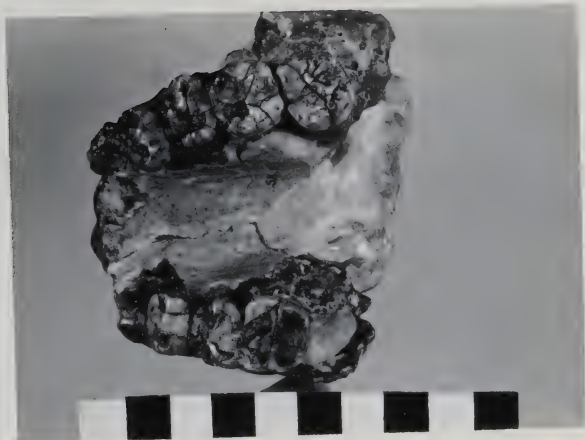
SK 52

Occlusal view of the right zygomatic arch and maxillary fragments containing some of the cheek teeth. The right M^2 is absent, and the dark-coloured right M^3 is seen to be just erupting. The premolars display extremely deep fissures joining their mesial and distal fossae. The P^4 's exhibit marked talons on their distal aspects, in contrast to the slight talons seen on the P^3 's.

Scale in centimetres.

SK - Mand.

SK (Hom) - Mand.





SK - Mand.

SK (Hom) - Mand.

Occlusal and lingual view of the cheek teeth in situ in the maxilla. The left M_2 is absent. The attritional wear of the M^1 's attests to their early eruption compared to the other cheek teeth. The Carabelli trait manifests as a pit on the M^2 , but is not readily identifiable on any of the other molars. Both M^3 's exhibit a discoloured hypoplasia of their enamel, suggesting a severe illness or metabolic disturbance during the childhood of this individual.

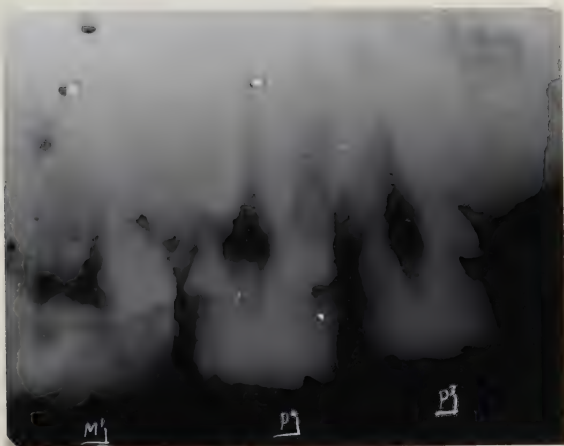
Scale in centimetres.

Bucco-lingual radiograph of right P^3 , P^4 , M^1 revealing the extent of their pulp chambers and a vague outline of their roots. The pulp chamber of the M^1 is of hypotaurodont.

Magnification: approximately 3x.

SK - Mand.

SK (Hom) - Mand.





SK - Mand.

SK (Hom) - Mand.

SK 24

AUSTRALOPITHECUS ROBUSTUS

View of $\underline{P^3}$ from the mesio-buccal aspect. The 3 roots are clearly evident, with a mesial "plate" joining the mesio-buccal (central) and lingual (left) roots. The undulating cervical line is discernible, and a moderate concavity of the mesio-buccal groove is evident.

Scale in centimetres.

SK 14

Radiograph of isolated left M^3 x-rayed along its M-D plane. The mesio-buccal and disto-buccal roots are superimposed on the left of the radiograph, and the single lingual root is widely splayed to the right. The very wide root canals are noteworthy, deriving from a comparatively small pulp chamber.

The buccal and lingual rows of cusps are separated from one another by a deep median fissure.

Magnification: approximately 3x.

SK - Mand.

SK (Hom) - Mand.



SK - Mand.

SK (low) - Mand.

SK 46

Radiograph of left maxillary molars displaying the sharp outlines of the scooped occlusal attritional wear facets on the \underline{M}^1 and \underline{M}^2 . The mesotaurodont pulp chamber of \underline{M}^3 is not as capacious as that of its antimere. Secondary dentine deposition is evident on the pulp chamber walls, providing, in part, for their fuzzy outline. The roots are obscured by dense petrification of the alveolar bone.

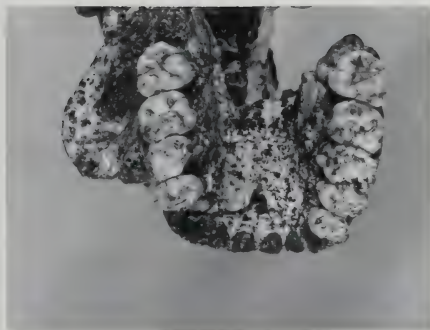
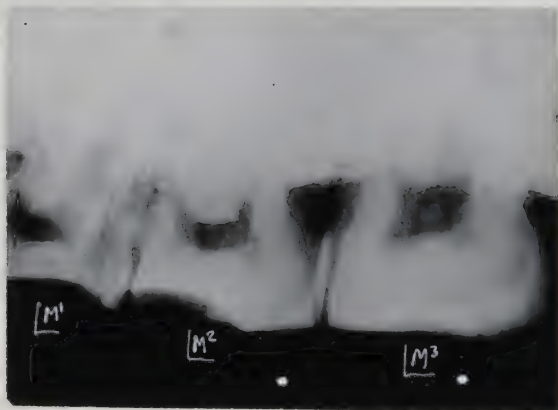
Magnification: approximately 3x.

SK 46

View of palate and occlusal surfaces of cheek teeth arranged in a nearly square dental arcade. While the occlusal surface attritional wear is considerable, the approximal attritional wear is even more marked, particularly on the mesial surfaces of the M^2 's and M^1 's. Islands of dentine are evident on the worn surfaces of the molars.

SK - Mand.

SK (Hom) - Mand.





SK - Mand.

SK (Hon) - Mand.

SK 46

Radiograph of right maxillary molars revealing severe undulating attritional wear of M^1 and M^2 and secondary dentine deposition in their pulp chambers. The large, mesotaurodont pulp chamber of the M^3 displays slight secondary dentine deposition on its occlusal aspect. Heavy petrification of the alveolar bone obscures the roots of all the teeth.

This radiograph overlaps with the previous radiograph.

Magnification: approximately 3x.

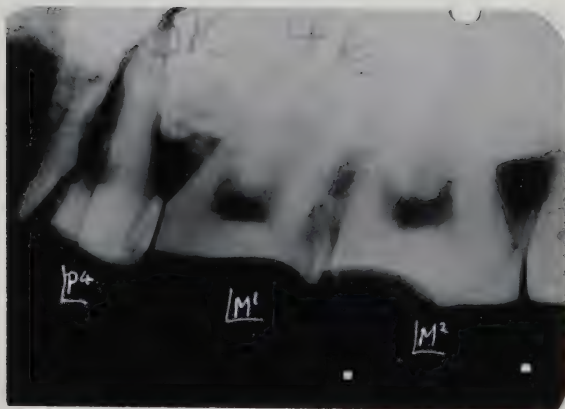
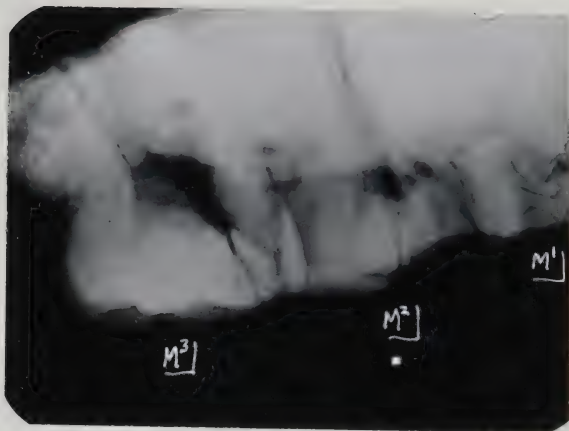
SK 46

Radiograph of left maxillary cheek teeth revealing the identical undulating occlusal attritional wear pattern seen on the right side. Secondary dentine deposition in the hypotaurodont pulp chambers is slight considering the severe attritional wear. Mesial approximal attritional wear on the M^1 is particularly evident. The P^4 is longitudinally fractured.

Magnification: approximately 3x.

SK - Mand.

SK (Hom) - Mand.



SK - Mand

SK (Hom) - Mand.

SK 55(a)

Radiograph of a fragment of the left maxilla containing portions of \underline{C} , P^3 , dm^2 , M^1 and the unerupted incomplete crown of P^4 . Both the teeth and bone fragment reflect a peculiarly mottled pattern of petrification.

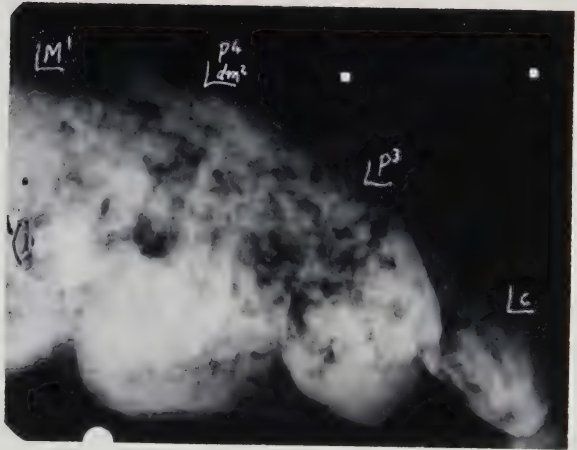
Magnification: approximately 3x.

Radiograph of a fragment of the left maxilla containing the erupted dm^2 and M^1 and a portion of M^2 . The vague outline of the incomplete, unerupted crown of P^4 can be seen immediately above dm^2 . No roots are discernible due to the heavily mottled petrification.

Magnification: approximately 3x.

SK - Mand.

SK (Hom) - Mand.



SK - Mand.

SK (Hon) - Mand.

SK 61

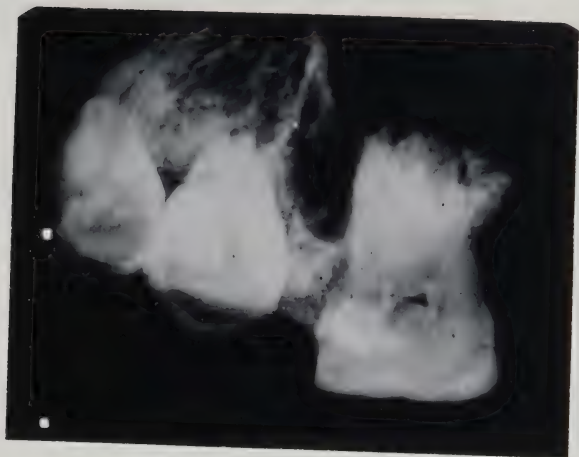
Radiograph of a fragment of the right maxilla containing P^3 , P^4 and M^1 . The P^3 and P^4 are seen along their vertical axes, through their occlusal surfaces, due to tilting of these teeth into a nearly horizontal plane. The M^1 is seen in its normal vertical axis, showing a worn occlusal surface, and extremely thick dentinal walls surrounding a tiny, cynodont pulp chamber. The M^1 root canals may be faintly discerned.

The delicate trabeculation of the alveolar bone is seen between the teeth.

Magnification: approximately 3x.

SK - Mand.

SK (hon) - Mand.





SK - Mand.

SK (Hom) - Mand.

SK 65

Radiograph of the right I^2 , C , P^3 and P^4 contained in a fragment of maxilla. This radiograph was "shot" at right angles to the buccal aspects of the teeth that provides a most unusual oval shape to the pulp chambers of the premolar teeth. Radiographing the teeth at a different angle appears to change the shape of the pulp chambers (vide infra). Both premolars project two roots that appear extraordinarily short in this view.

Magnification: approximately 3x.

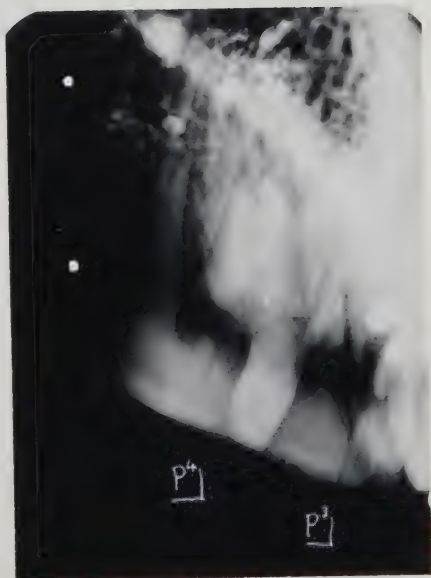
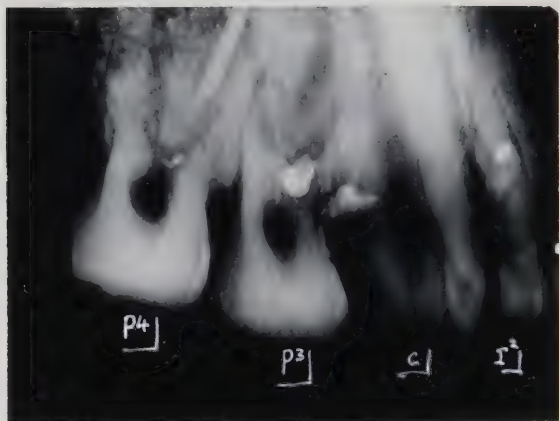
SK 65

Radiography of the same P^3 and P^4 as above, "shot" at an oblique angle from distal to mesial that provides for an overlapping of the crowns of the teeth, and changes the configuration of the pulp chambers and the length of the roots. The pulp chambers now project "pulp horns" towards the occlusal surface of the teeth, and are mesiodistally elongated to enter into wide root canals. The crown of P^3 is seen to be fractured longitudinally. Wide trabeculation of the alveolar bone is evident at the apices of the roots.

Magnification: approximately 3x.

SK - Mand.

SK (Hom) - Mand.



SK - Mand.

SK (lion) - Mand.

SK 74(c)

Mesio-distal radiograph of right P³ revealing the full bucco-lingual extent of the capacious pulp chamber. The peaks of the cusps of the occlusal surface are seen to be worn flat and the mesio-distal fissure separating the buccal and lingual cusps is seen as a deep indentation in the enamel, almost reaching the dentine, that is humped in the centre of the pulp chamber.

The mesio-buccal and disto-buccal roots are superimposed, and the lingual root on the right is seen to be widely divergent from the 2 buccal roots.

Magnification: approximately 3x.

SK - Mand.

SK (Hom) - Mand.





SK - Mand.

SK (Hom) - Mand.

SK 79

Palatal view of a maxilla containing badly fractured cheek teeth. Considerable ante-mortem occlusal and interproximal attritional wear of the teeth is evident. The parabolic shape of the dental arcade is noteworthy.

Scale in centimetres.

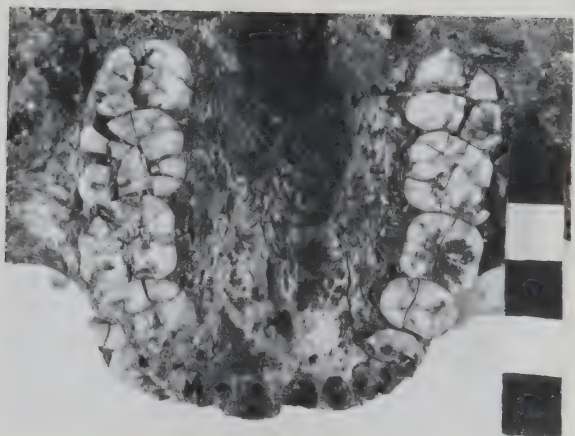
SK 1400

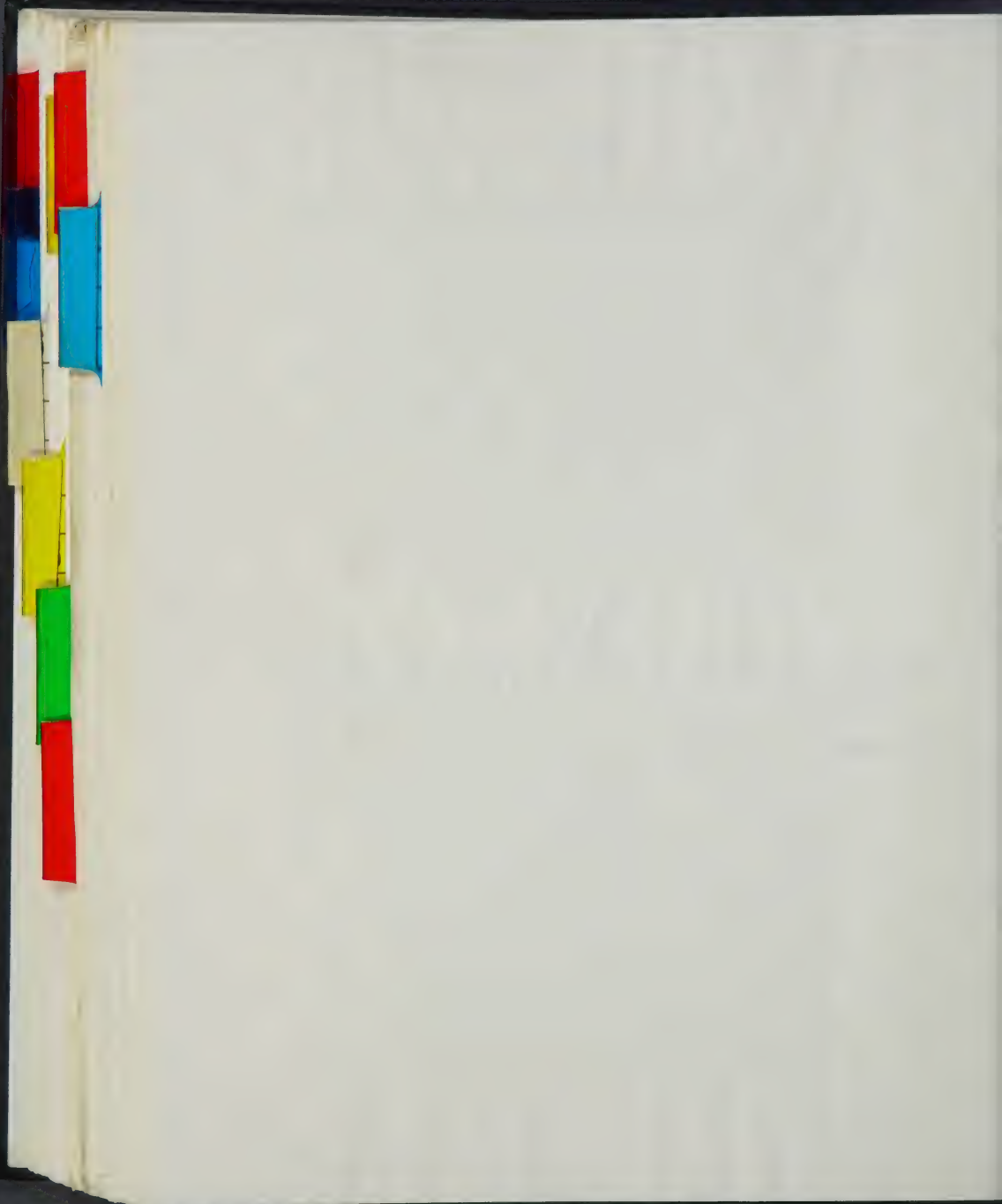
Fragment of (? maxillary) molar split bucco-lingually to reveal extent of pulp chamber and root canals. Limestone deposits can be seen within the pulp chamber. The wide buccal and lingual divergence of the roots is noteworthy.

Scale in centimetres.

SK - Mand.

SK (Hom) - Mand.





SK - Mand.

SK (hon) - Mand.

SK 826(a)

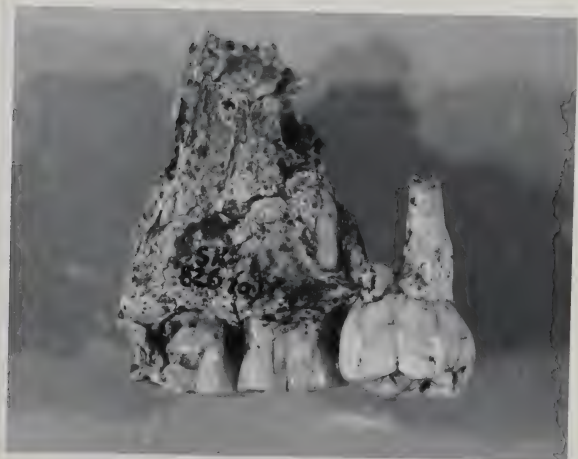
Distal surface view of left M^2 revealing its incompletely formed disto-buccal and lingual roots. The cervical line of the amelo-cemental margin is seen as a nearly straight demarcation between root and crown. The partial formation of the roots attests to this maxillary fragment being that of an adolescent individual, that is corroborated by the very slight wear of the crown's occlusal surface.

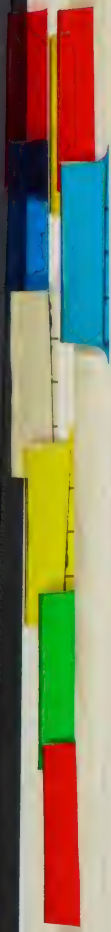
Buccal view of left maxillary fragment containing portions of P^3 and P^4 (to the left), a much worn M^1 and an intact M^2 whose disto-buccal root is seen isolated. Note the Grade I projection of enamel into the bifurcation of the two buccal roots.

SK - Mand.



SK (Hom) - Mand.





SK - Mand.

SK (Hom) - Mand.

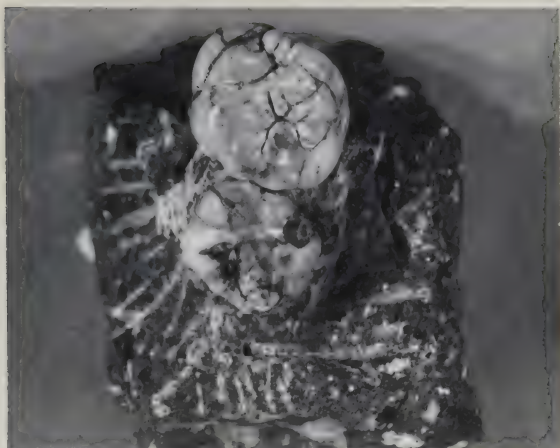
SK 838(a)

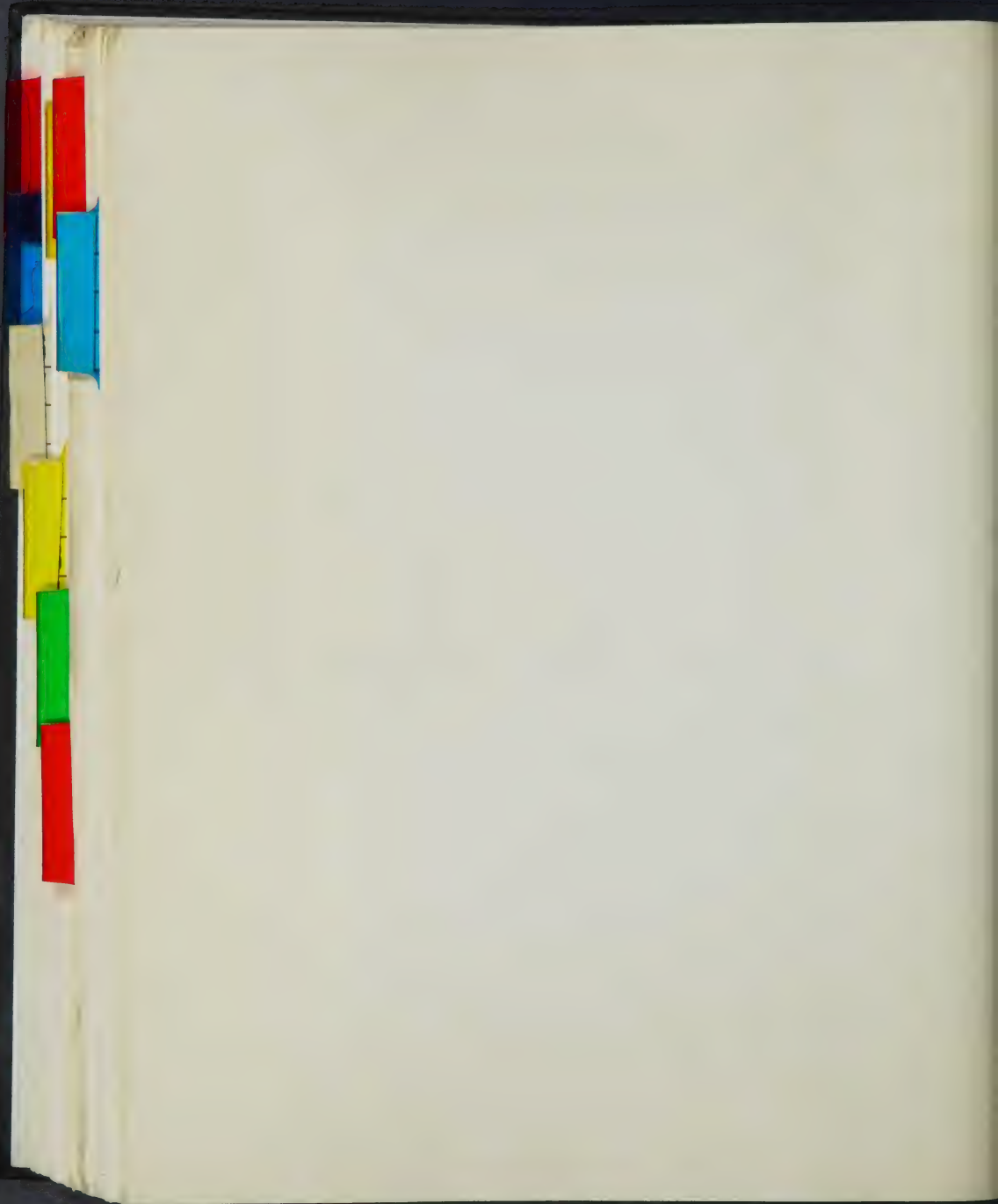
Occlusal view of right dm^2 and M^1 exhibiting moderate attritional wear. The deep fissure pattern of M^1 is, however, clearly evident, and the Carabelli trait on the protocone is seen as a shallow pit.

Radiograph of maxillary fragment revealing the dense petrification of the bone and the outlines of the molar teeth. The very deep extent of the fissures of M^1 is clearly evident in this x-ray and the extraordinary thickness of the enamel and dentine of this tooth is noteworthy.

SK - Mand.

SK (Hom) - Mand.





SK - Mand.

SK (Hom) - Mand.

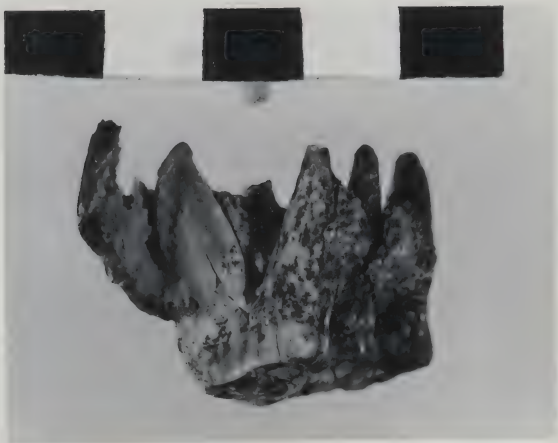
SK 877

Mesio-lingual view of P_4 with $M^1 M^2$ in the background. The extensive attritional wear of the crown is evident, eliminating cuspal and fissural features. The straight horizontal nature of the cervical enamel line is seen. The wide separation of the lingual (right) root from the mesio-buccal (left) root to which alveolar bone is attached is clearly shown.

Scale in centimetres.

SK - Mand.

SK (Hom) - Mand.





SK - Mand.

SK (Hon) - Mand.

SK 877

Occlusal view of right P^4 , M^1 and fragment of M^2 , all of them exhibiting moderately severe attritional wear. Most noteworthy is the mesial approximal attritional wear seen on M^1 and particularly on M^2 . The fissure patterns have been all but obliterated.

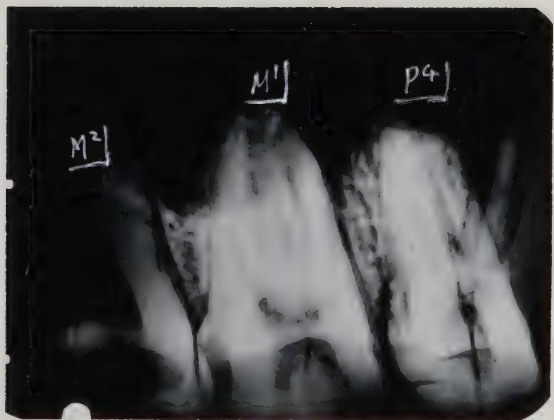
Scale in centimetres.

Radiograph of right P^4 , M^1 and mesial fragment of M^2 revealing their root patterns.

Magnification: approximately 3x.

SK - Mand.

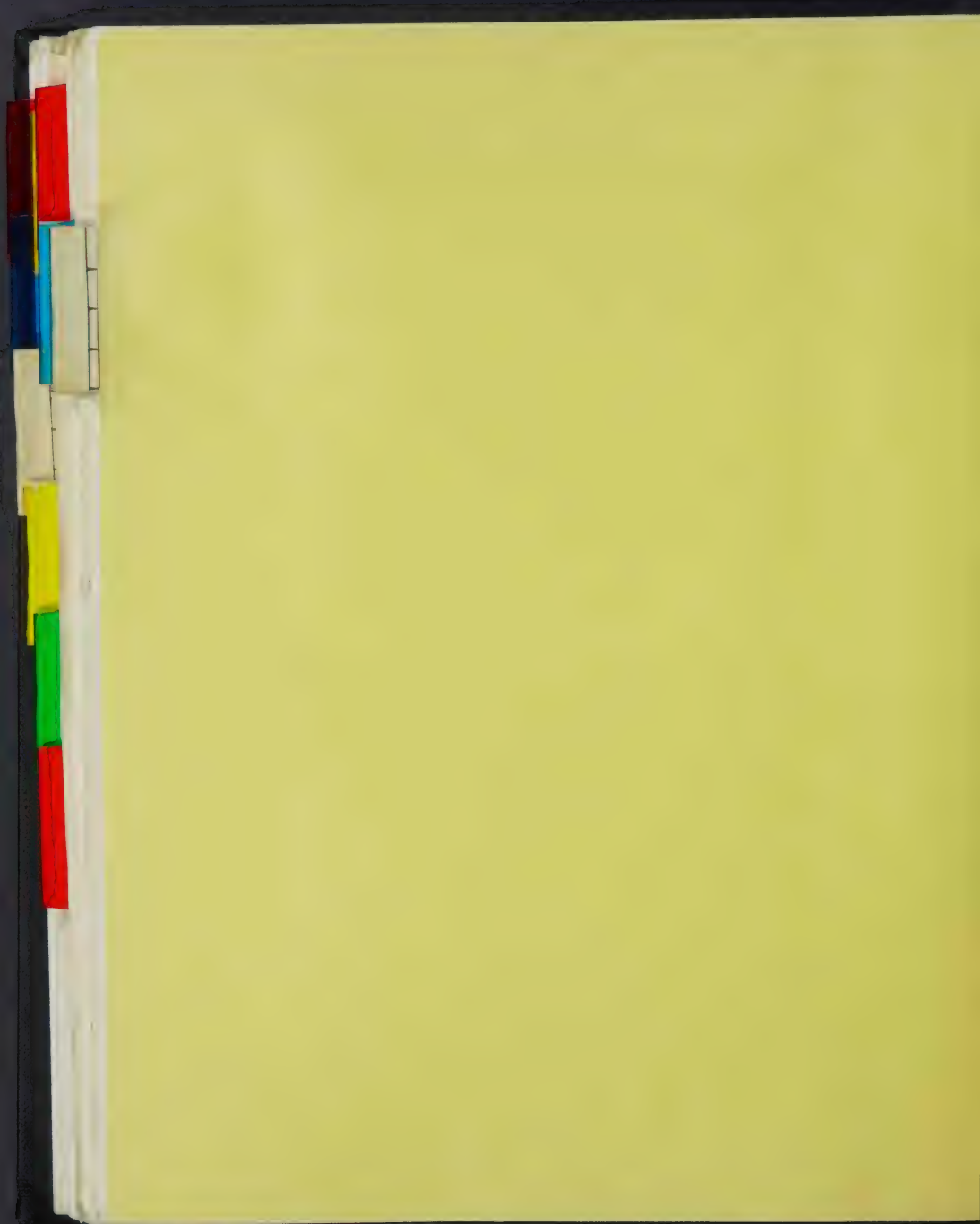
SK (Hom) - Mand.





SK - Mand.

SK (Hom) - Mand.



SWARTKRANS

Mandibular Teeth

SK 6
SK 12
SK 23
SK 883
SK 30
SK 55(b)
SK 61
SK 62
SK 63
SK 64
SK 74(a)
SK 88
SK 857
SK 824
SK 826
SK 843
SK 844
SK 876
SK 1587(a)
SK 3978

SK (Hom) - Mand.



SK 6

Australopithecus Robustus

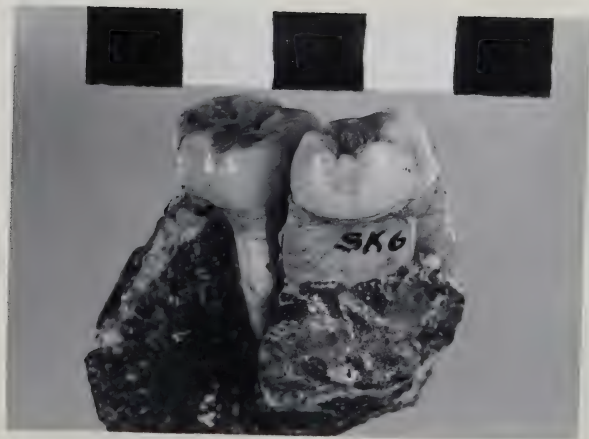
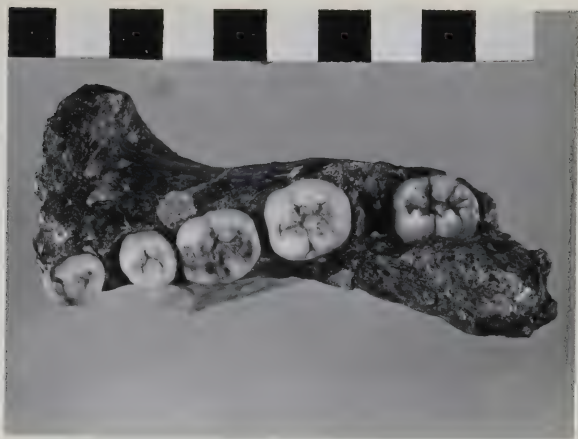
Occlusal view of left half of mandible with cheek teeth separated during fossilization. The moderately severe attrition of the M_1 contrasts with the slight wear on the M_2 , and no wear on the M_3 which is still erupting. The P_3 is slightly more worn than the P_4 .

A Y-shaped fissure joins the mesial and distal occlusal fossae of the P_4 . These fossae are separated by a broad bucco-lingual ridge in the P_3 . The Y-5 fissure pattern is evident in all the molars, with the distally-located hypoconulid broken into 3 tubercles in the M_3 . The increasing crown size of $M_3 > M_2 > M_1$ is evident.

SK 6

The right P_4 (marked SK6) and M_1 , contained in a fragment of mandible, photographed from the mesio-buccal aspect. The P_4 is distorted, being abnormally broad (16.5 mm) in its bucco-lingual diameter. The massive buccal and lingual roots of the P_4 are also noteworthy. The M_1 exhibits moderately severe attrition, but retains its Y-5 groove pattern. The mesial and buccal roots of the M_1 are widely splayed.

Scale in centimetres.





SK (Ham) - Mand.

SK 12

Occlusal surface view of mandible portraying the wide parabolic dental arcade. While the cheek teeth have been preserved, their crowns have been badly damaged during fossilization. The M_1 's exhibit considerable occlusal surface attrition. The M_3 's exhibit the least occlusal attrition.

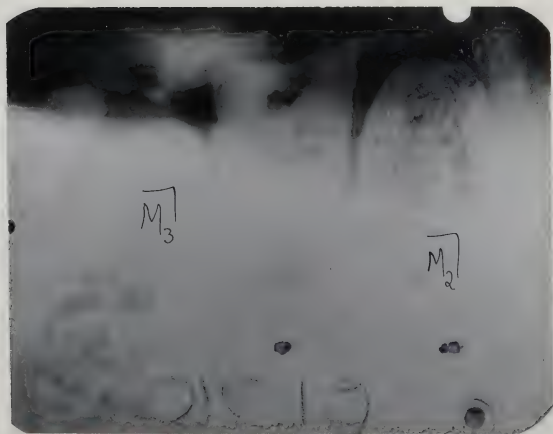
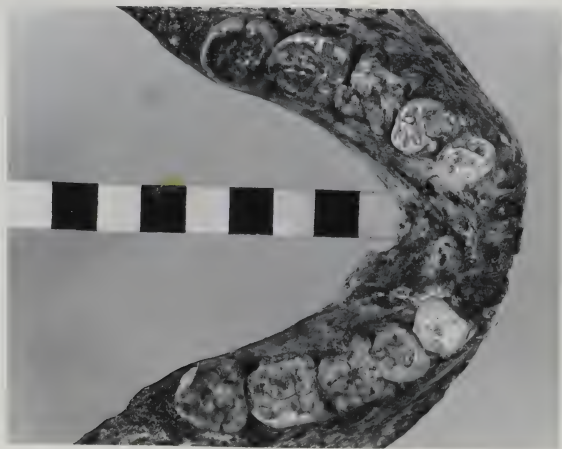
Scale in centimetres.

SK 12

Radiograph of M_3 and M_2 (R) reveals the hypotaurodont configuration of pulp chambers as radiolucent areas. The apical regions of the roots are lost in the radio-opaque, densely petrified bone of the mandible.

Magnification of the teeth is evident when compared to their photograph above.

Magnification: approximately 3x.



6. SK (Hom) - Mand.

SK 23

Occlusal surface of mandible containing full complement of permanent teeth. Lateral compression of the mandible during fossilization appears to have narrowed the dental arcade. Moderate attritional wear of the teeth has not eradicated their fissure patterns, revealing the unusual fissure pattern on the abnormally broad (bucco-lingually) left P_4 . All other teeth display considerable symmetry of the antimeres, the buccal portion of the right M_1 having been restored with plaster.

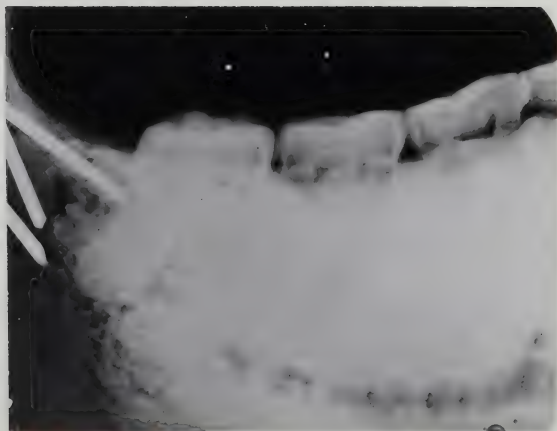
Scale in centimetres.

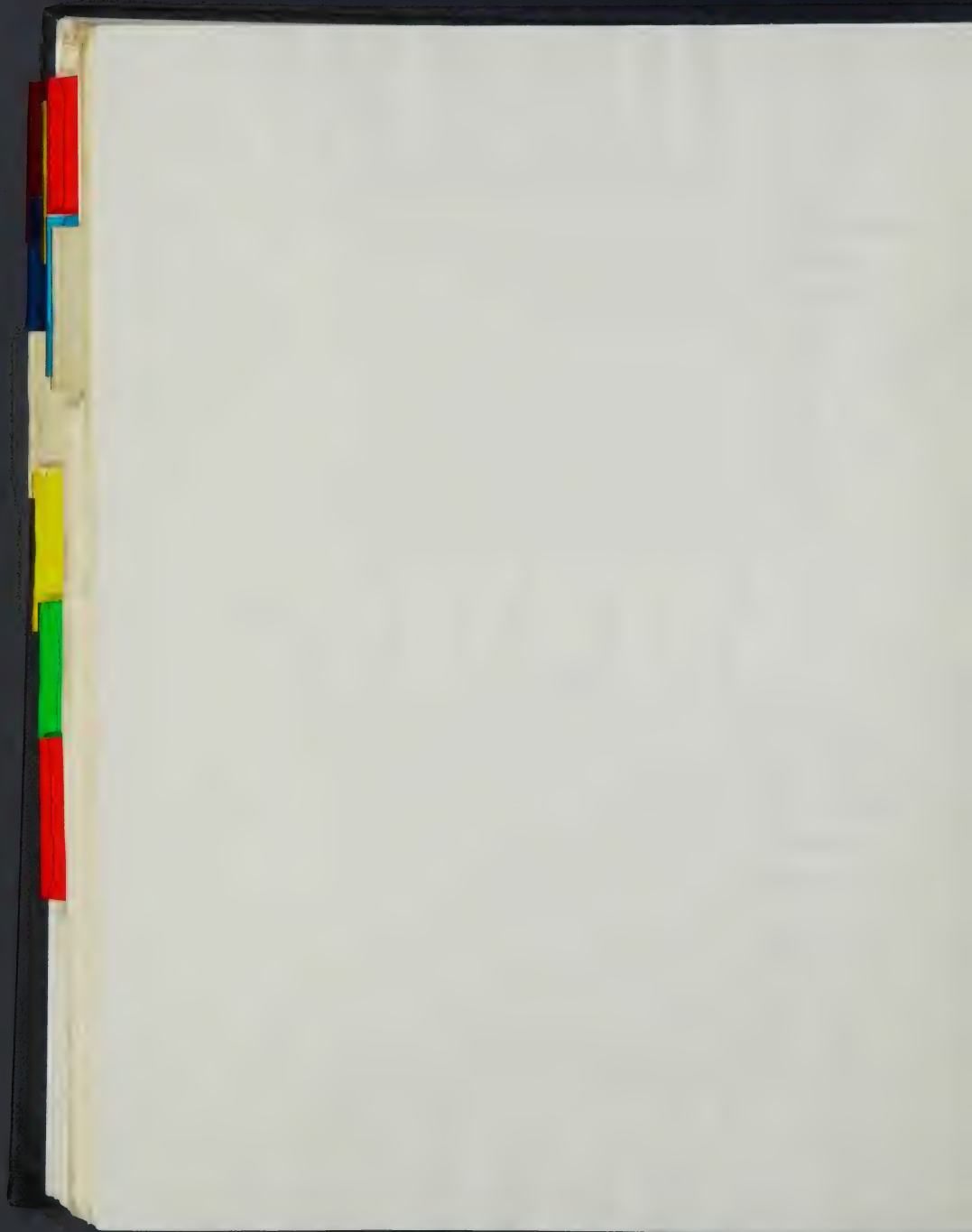
SK 23

Radiograph of the right mandible containing all the teeth in situ. The pulp chambers of the molar teeth can be discerned as being hypotaurodont in form. The roots of the teeth are largely obscured by dense petrification of the mandibular bone, but the mandibular canal may be seen traversing the lower part of the radiograph.

Reinforcing wires are seen in the ascending ramus of the mandible.

Magnification: approximately 3x.





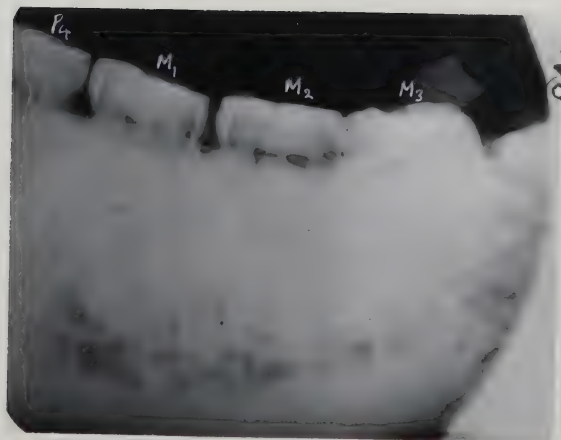
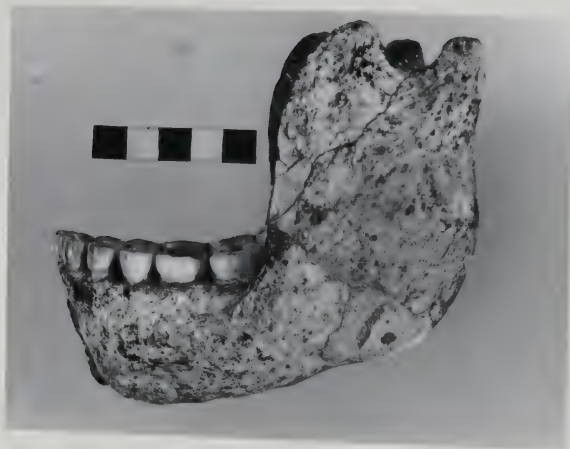
SK (Hon) - Mand.

Left lateral view of mandible revealing buccal aspect of the cheek teeth and the degree of attritional wear of their occlusal surfaces. Very shallow grooving of the buccal aspects of P_3 and P_4 is seen, while the buccal aspects of M_1 and M_2 are almost featureless. The massive antero-posterior width of the ramus of the mandible is clearly evident.

Scale in centimetres.

Radiograph of the left P_4 , M_1 , M_2 and M_3 revealing the attenuated form of their pulp chambers. Although dense petrification largely obscures the radiographic shadows of the roots of these teeth, the great length of the roots of M_1 can be faintly discerned. The variegated nature of the petrification of the bone of the mandible can be seen, as can the outline of the mandibular canal.

Magnification: approximately 3x.





SK (Ham) - Mand.

SK 23

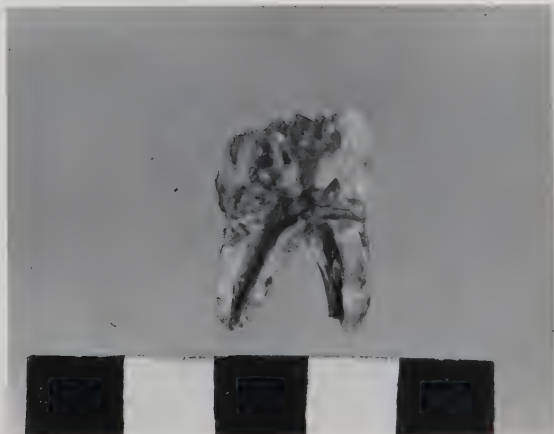
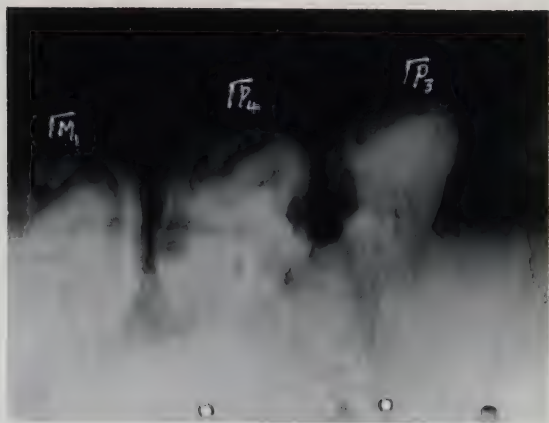
Radiograph of the left P_3 , P_4 and M_1 . The pulp chambers of the premolars are very constricted and vertically elongated. The presence of double roots in both the premolars is evident from the radiolucent shadows of the root canals.

Magnification: approximately 3.

SK 883

Fragment of a mandibular molar split mesio-distally to reveal its pulp chamber and root canals. The great thickness of the dentine walls of the pulp chamber is evident. The pulp chamber is of hypotaurodont form.

Scale in centimetres.



SK (Hom) - Mand.

SK 30

Mesio-lingual aspect of P_3 (L) showing occlusally worn crown and grooving of the mesial root (a) that terminates in double apices (b). The deep cleft between the mesial and distal roots seen on this lingual aspect is closed off by fusion of the roots on the buccal aspect. A grade I projection of enamel (c) is seen to dip into the root bifurcation. A very slight mesial attritional facet is seen on the enamel (d).

Scale in centimetres.

SK (Hon) - Mand.





SK (Hon) - Mand.

SK 55(b)

Radiograph from the lingual aspect of the left mandibular fragment containing dm_2 , M_1 and part of M_2 in situ. Part of the incomplete crown of P_4 may be seen beneath dm_2 as a densely radio-opaque area.

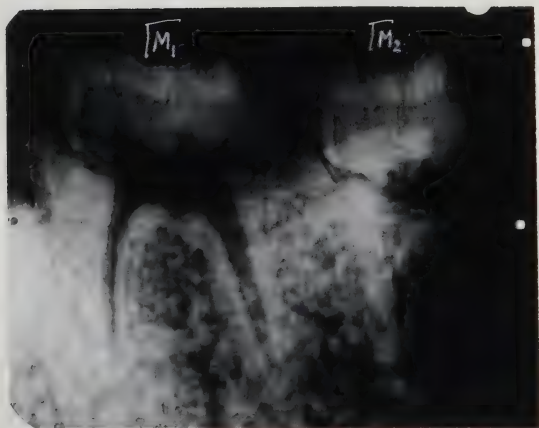
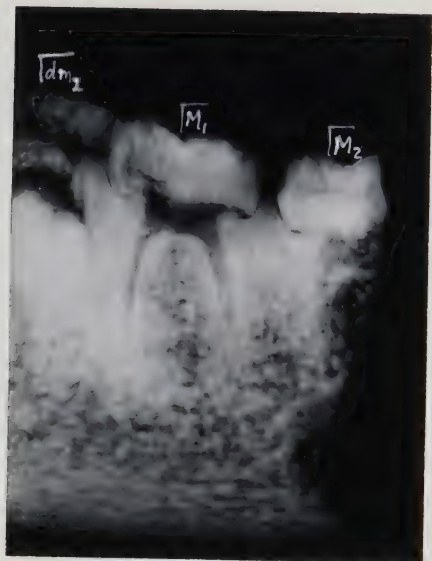
The fine trabeculation of the bone is very clearly depicted. The outlines of M_1 and M_2 are magnified below.

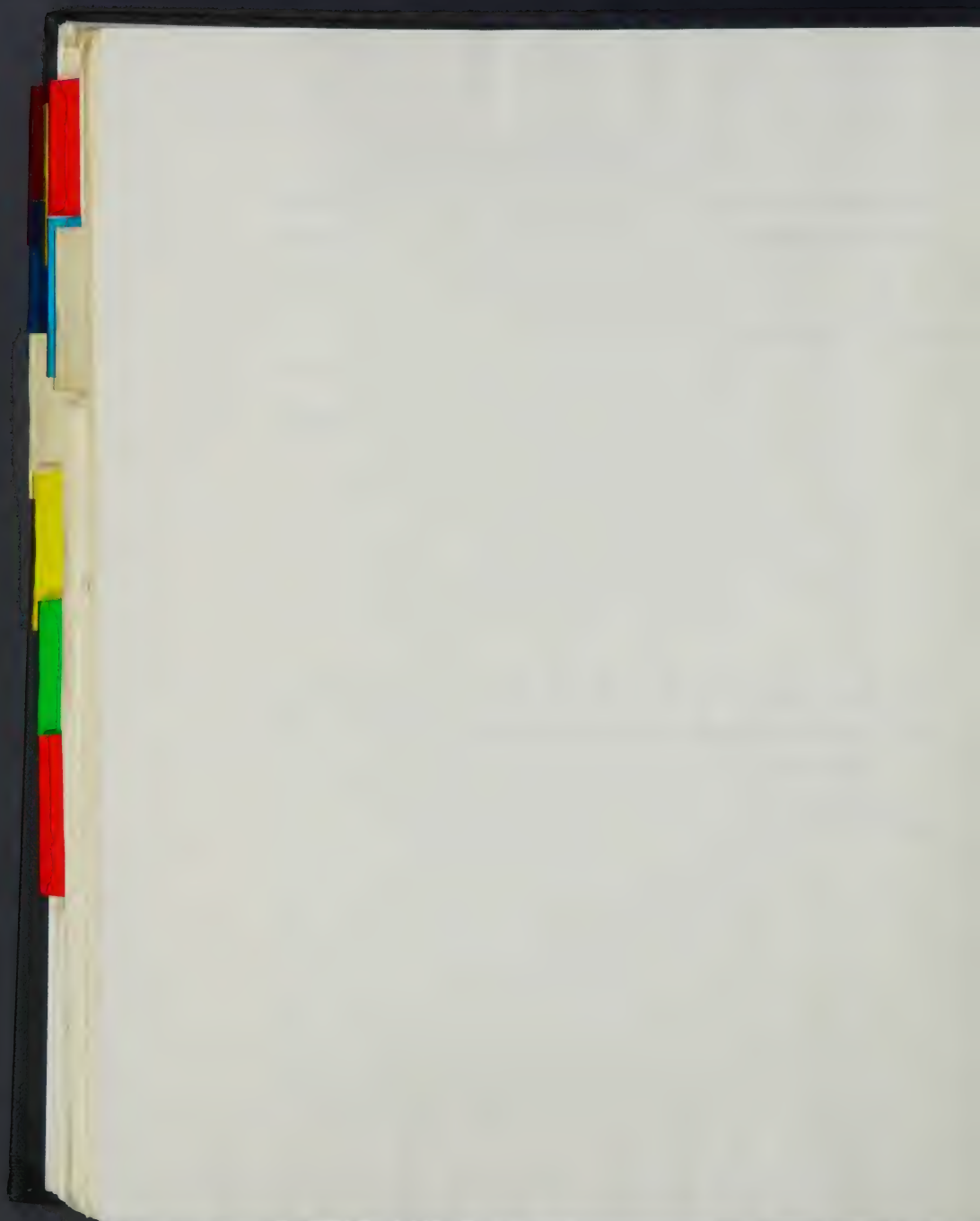
Magnification: approximately 2x.

Radiograph of the left M_1 and the mesial portion of M_2 set in the mandible. Their pulp chambers are clearly outlined and are seen to be hypotaurodont in form, with rather jagged outlines to their roofs.

Varying degrees of petrification would account for the mottled appearance of the enamel of the teeth.

Magnification: approximately 4x.

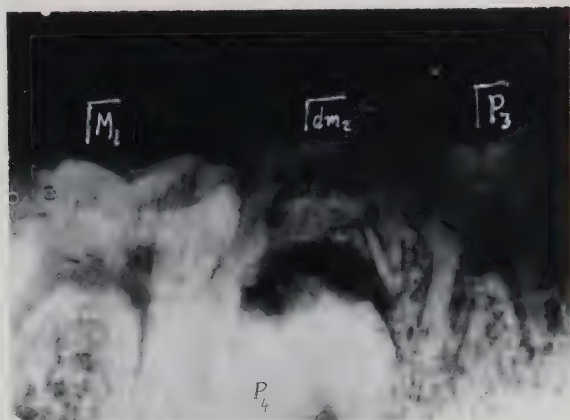


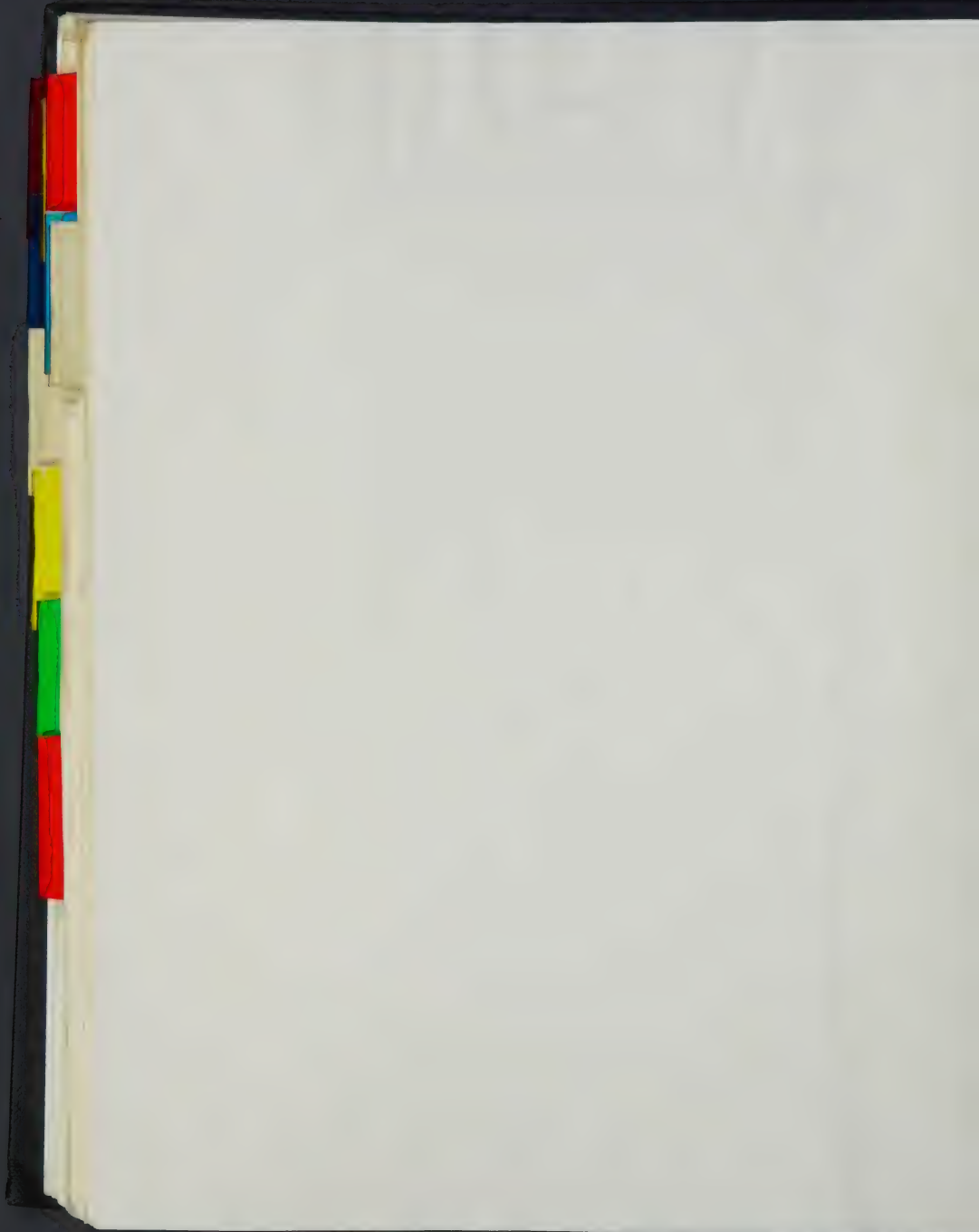


SK (Hom) - Mand.

Radiograph from the buccal aspect of the left mandibular fragment, containing the erupted P_3 , dm_2 and M_1 . The fully formed crown of the unerupted P_4 is seen beneath dm_2 . P_3 is clearly seen to be double-rooted. The M_1 pulp chamber is of hypotaurodont form. The mottled appearance of the teeth and bone probably reflects irregular petrification.

Magnification: approximately 2x.





SK (Hon) - Mand.

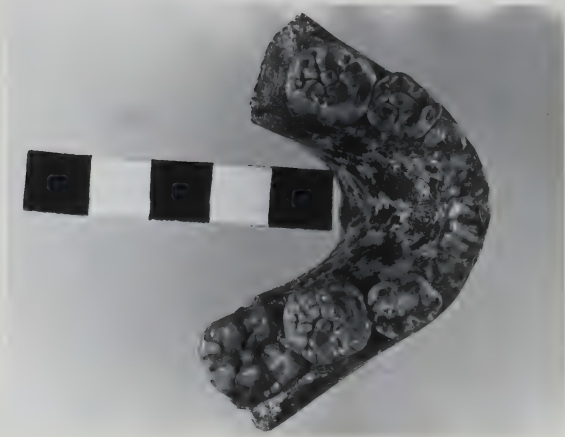
SK 61.

Occlusal view of the mandible of a child containing a mixed deciduous and permanent dentition. The right I_1 has erupted, and the right M_1 is partially erupted. The deciduous teeth are moderately abraded. The deep fissures on the unworn M_1 are seen to terminate in a deep pit on the buccal aspect of M_1 between the protoconid and hypoconid.

Scale in centimetres.

Radiograph of the right mandible containing the erupted deciduous molars and the partially erupted M_1 . Dense petrification of the mandible obscures the sites of formation of the P_3 and P_4 . Note the clarity of the pulp chamber of dm_1 compared to its partial petrification in dm_2 . The roots of M_1 are seen to be incompletely formed.

Magnification: approximately 3x.



2

SK (Hom) - Mand.

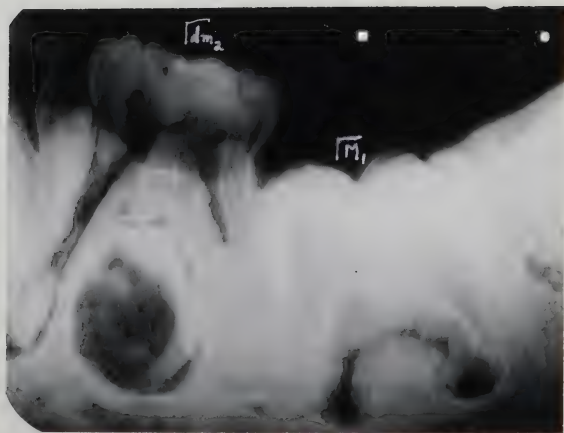
SK 62

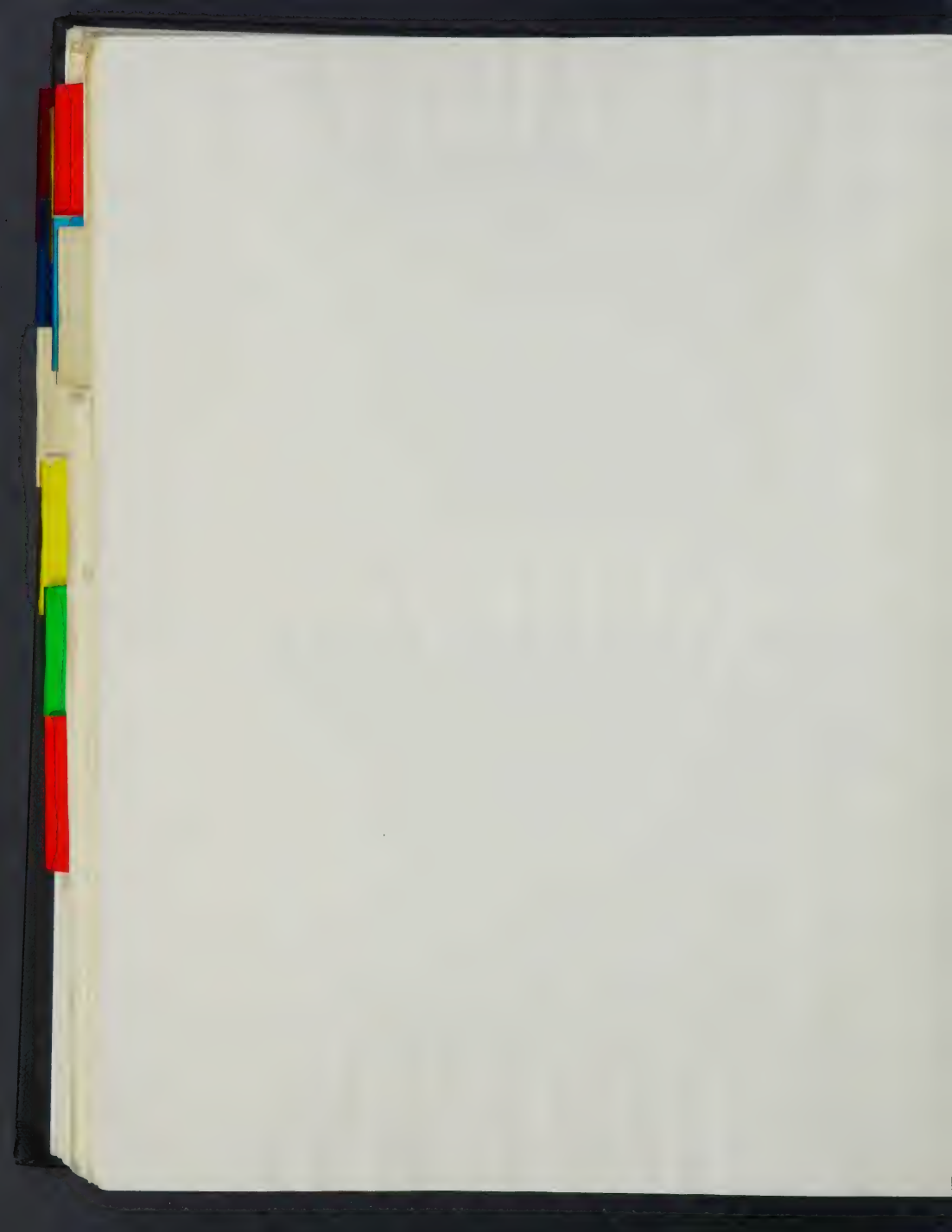
Occlusal view of the partially restored mandible of a child, containing the deciduous teeth and the left M_1 at an early stage of eruption.

Scale in centimetres.

Radiograph of the left mandible depicting the fully erupted dm_2 , whose roots are embracing the developing crown of the P_4 , and the crown of the emerging M_1 whose roots are incompletely developed. The early formation of the crown of M_2 can be observed in the ascending ramus of the mandible.

Magnification: approximately 3x.





SK (hom) - Mand. 1

SK 63

Lingual view of the fractured mandible of a child containing erupted deciduous molars and first permanent molars in situ.

Scale in centimetres.

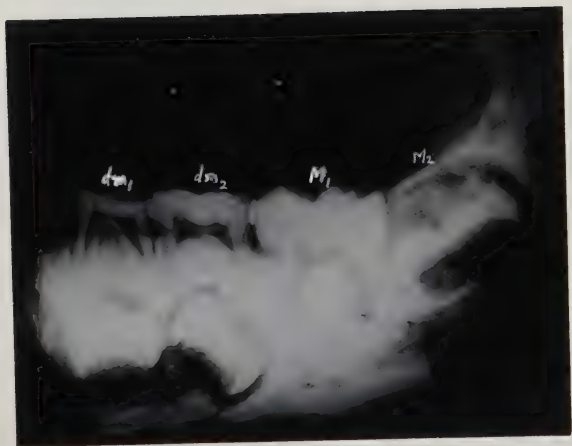
SK 63

Radiograph of the ^{P. 2/1} ~~left~~ mandible showing the erupted dm_2 and M_1 and the partially formed crown of the unerupted M_2 . The roots of M_1 are seen to be incompletely formed. Superimposition of the buccal and lingual cusps of the M_1 and M_2 create the multicusped appearance. The pulp chamber of M_1 is of cynodont form.

Magnification: approximately 3x.



SK (Hom) - Mand.





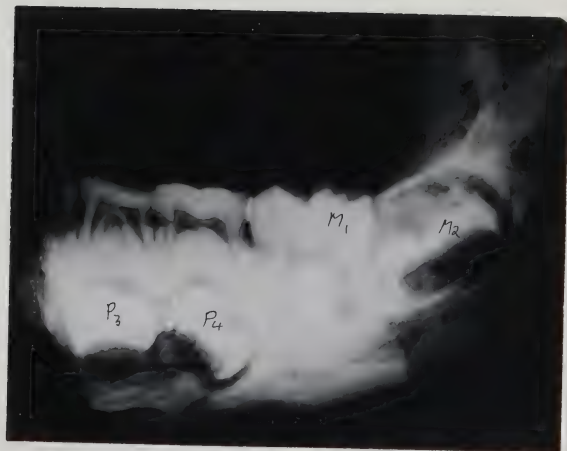
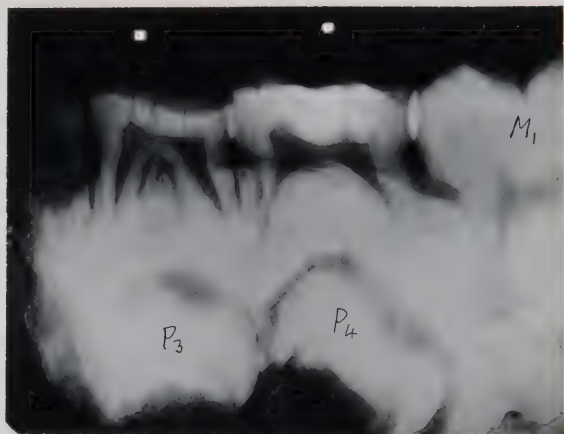
SK (Hom) - Mand.

Radiograph of the right mandible from the lingual aspect depicting the erupted dm_1 , dm_2 and erupted M_1 , and the unerupted P_3 and P_4 . Magnified view of radiograph seen below.

Magnification: approximately 3x.

Radiograph of the right mandible showing unerupted P_3 , P_4 and M_2 , and the erupted dm_1 , dm_2 and M_1 . The roots of the unerupted teeth have not yet formed, and those of the newly erupted M_1 only partially so. The crown of the P_4 is seen to be distally rotated and wedged in between the roots of the dm_2 . The occlusal attritional wear of the deciduous molar is evident, while the unworn cusps of M_1 are sharply peaked.

Magnification: approximately $1\frac{1}{2}x$.



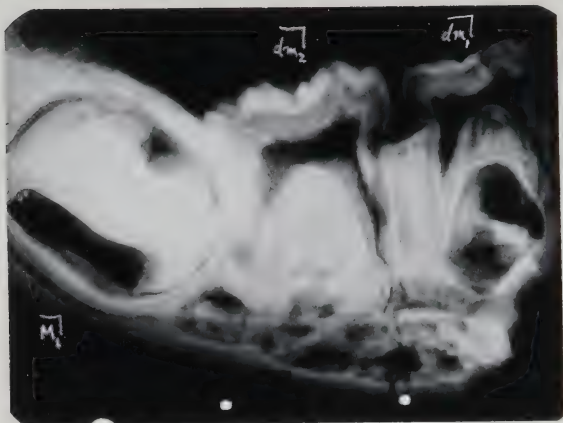


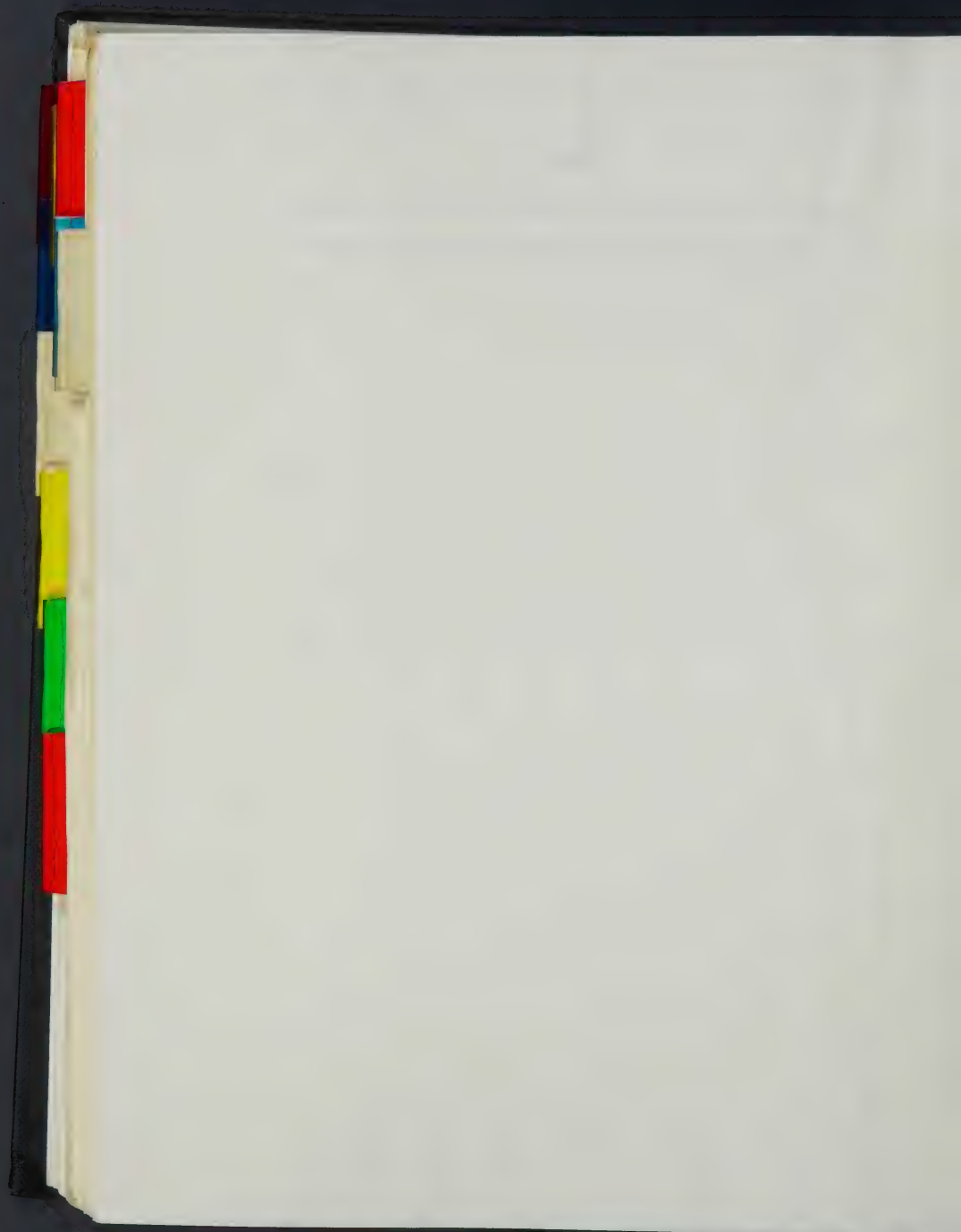
SK (Hom) - Mand.

Radiograph of the right mandible of a child containing erupted deciduous teeth and the unerupted incomplete crowns of the P_3 , P_4 and M_1 . The large pulp chambers of the deciduous molars are clearly outlined, and their roots are seen to encompass the follicles of the forming premolar crowns. The follicle of the M_1 is unusually well outlined, and root formation is seen to be just commencing.

A vertical fracture line is seen to run through the mesial root and body of the mandible.

SK (Hom) - Mand.





SK (Hom) - Mand.

SK 74(a)

Occlusal surface view of mandible portraying parabolic dental arcade narrowing towards the third molar region. Extensive damage to the teeth allowed only the right P_3 , P_4 and M_2 to be measured. The approximal attritional wear of the P_3 and P_4 is noteworthy. The groove patterns of none of the teeth are discernible.

Scale in centimetres.

SK 74(a)

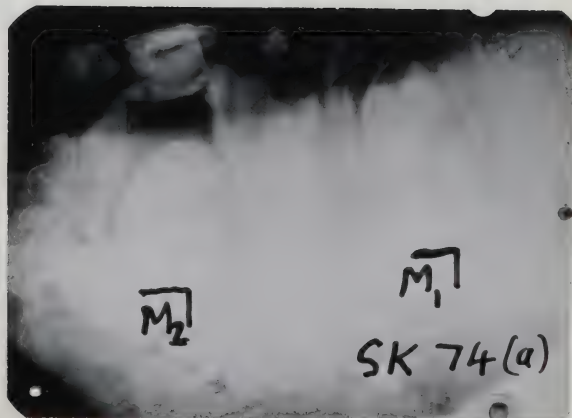
Radiograph of right M_1 and M_2 revealing their hypotaurodont pulp chambers, particularly evident in M_2 . Despite the marked occlusal attritional wear of the M_2 , no secondary dentine appears to have been laid down in its pulp chamber. Heavy petrification of the alveolar bone obscures the apices of the roots.

Magnification of the teeth is evident when compared with their photograph above.

Magnification: approximately 3x.



SK (Hon) - Mand.



SK (Hon) - Mand.

SK 74(a)

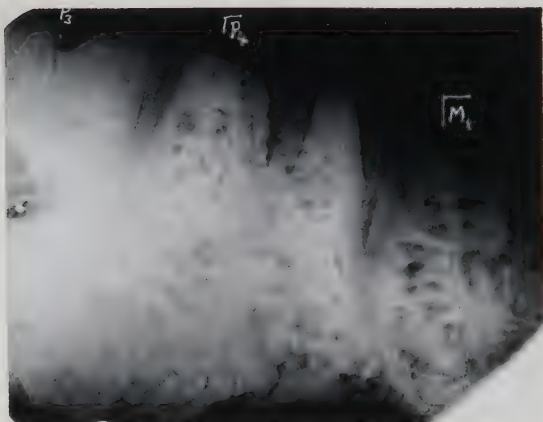
Radiograph of left half of mandible revealing the sockets for the double roots of P_3 , P_4 and M_1 . The trabeculation of the alveolar bone is clearly evident.

Magnification: approximately 3x.

SK 74(a)

Radiograph of the right half of the mandible containing the right P_3 and P_4 . The bifurcation of the root canal of the P_3 indicates this tooth is double-rooted. The root(s) of P_4 is obscured by dense petrification of the alveolar bone.

Magnification: approximately 3x.



SK (Hom) - Mand.



SK (Hon) - Mand.

SK 88

The occlusal surface of the left P_4 reveals the predominant size of the buccal cusp (left) over the lingual cusp (right) and the small talonid (^{below}~~above~~). The mesial and distal fossae are shallow. The triangular ridge of the buccal cusp is indented by wrinkling of the enamel, which is also evident on the triangular ridge of the lingual cusp.

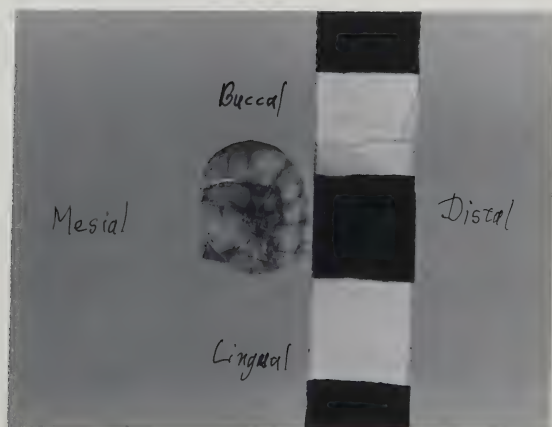
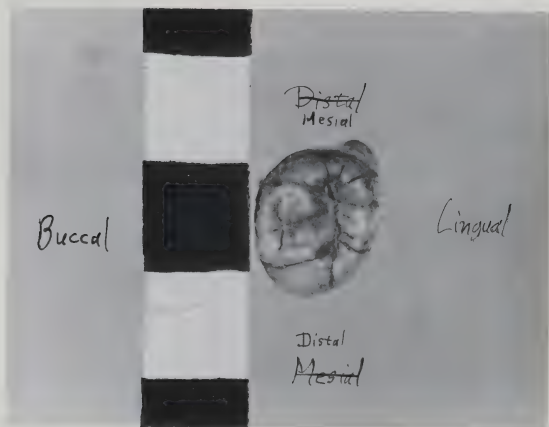
The cracks in the enamel are unrelated to its morphology.

Scale in centimetres.

SK 857

The occlusal surface of the P_3 (R) exhibits a shallow-shaped groove separating the buccal cusp (above) from the lingual cusp (below) and the moderately large talonid (right). A shallow disto-buccal groove demarcates the talonid from the buccal cusp on the buccal face. The talonid is partially subdivided into 3 tubercles ("distoconules"). The cracks in the enamel are unrelated to its morphology.

Scale in centimetres.



SK (Hon) - Mand.

SK 824

The occlusal surface of the left P_4 exhibits a highly symmetrical pattern of nearly equal buccal (below) and lingual (above) cusps, and a conspicuous talonid (left). The talonid shows a tendency to multiple tubercle formation ("distoconulids"). The occlusal grooves form an "H" pattern.

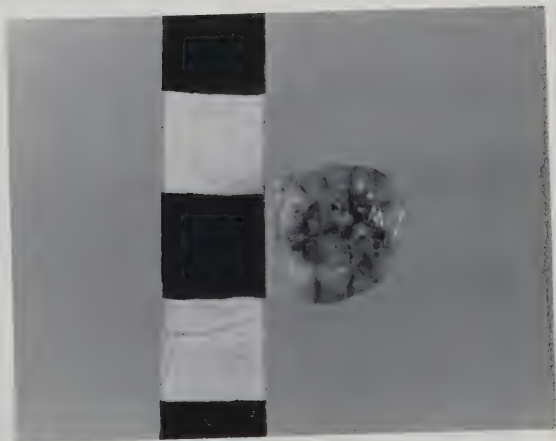
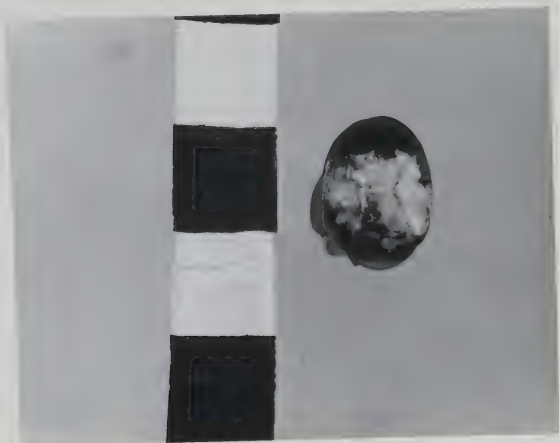
The black mottling of the enamel most probably occurred during fossilization.

Scale in centimetres.

SK 826

The occlusal surface of the left P_4 reveals the groove configuration separating the lingual cusp (above) from the buccal cusp (below) and the talonid to the right. The disto-buccal groove deeply indents the buccal face of the crown. There is a hint of the talonid being broken up into tubercles ("distoconulids"). The enamel, which is unabraded, features a number of cracks.

Scale in centimetres.



SK (Hom) - Mand.

SK 843

Mesial view of left M_1 revealing the extreme width of the mesial root (14.2 mms) and its bifurcation into 2 widely separated apices.

Buccal view of left M_1 M_2 and partially calcified crown of M_3 contained in the ramus/body angle of the mandible. The exposed mesial and distal roots of the M_1 , seen from this view, give no indication of their extreme bucco-lingual extension seen in the above photograph.

SK (Hom) - Mand.

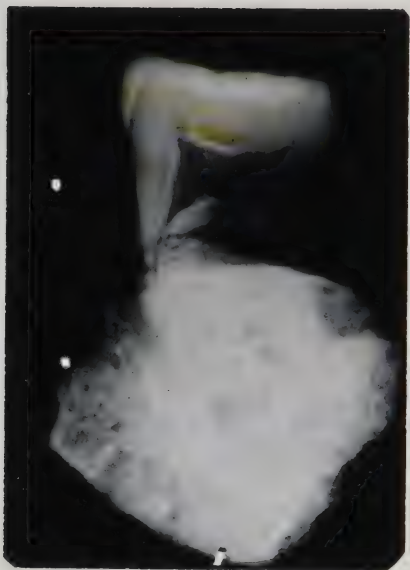


SK (Hom) - Mand.

SK 840

Radiograph of an isolated left M_3 attached to a fragment of mandible. Moderate occlusal attritional wear is evident. The exceptionally clear outline of the pulp chamber reveals it to be of mesotaurodont form, occupying a considerable "body" between the crown and roots of the tooth.

Magnification: approximately 3x.



SK (Hom) - Mand.



SK (Hon) - Mand.

SK 844

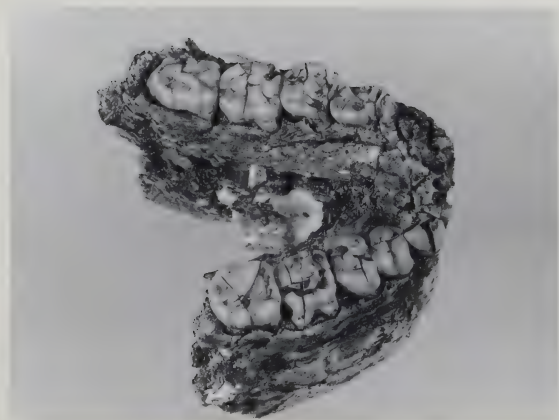
Linguo-occlusal view of the ascending ramus and body of the left mandible containing M_2 and M_3 . Both molars exhibit considerable attritional wear. The crown of M_2 (to the right) is almost totally destroyed. A Y-5 groove pattern is discernible on the M_3 .

Scale in centimetres.

SK 876

An oblique occlusal view of the body of the mandible containing the much-fractured cheek teeth. Considerable ante-mortem attritional wear - both occlusal and interproximal - of the teeth is evident. The bifurcation of the M_1 roots is seen as a result of alveolar bone loss.

SK (Hom) - Mand.





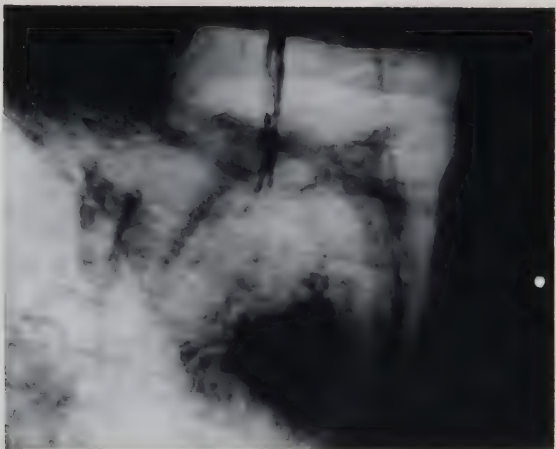
SK (Hom) - Mand.

AUSTRALOPITHECUS ROBUSTUS

SK 876

Radiograph of right M_3 displaying this molar's enormous MD diameter of 19.6 mm., and revealing its slightly hypotaurodontic pulp chamber tending towards cynodontism by virtue of its constricted height, supra-alveolar position and the widely splayed origin of the root canals.

Magnification: approximately 3x.



SK (hom) - Mand.

SK (Hom) - Mand.

SK 1587(a)

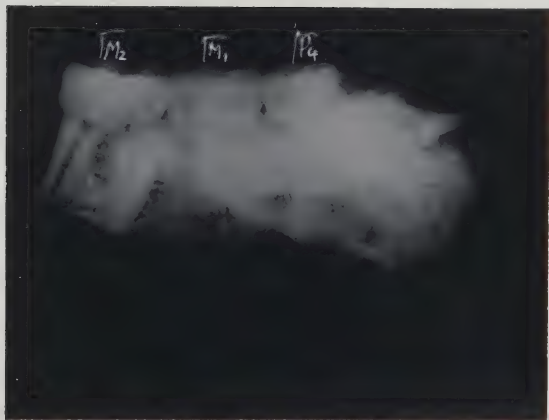
Occlusal surfaces of roots of left P_3 and crowns of P_4 , M_1 and M_2 . The double-rooted nature of P_3 is evident, its roots being buccally and lingually placed. The P_4 is considerably molarized by virtue of its large distal talonid. Despite considerable occlusal attritional wear, the \perp groove pattern of the P_4 and the Y-5 groove pattern of the molars are evident. The occlusal attritional wear of the M_1 has exposed islands of dentine in the protoconid, hypoconid and metaconid. The considerable mesial approximal attrition of the M_1 is of interest in having caused only slight concomitant wear on the juxtaposed distal approximal surface of the P_4 . The darkening of the worn enamel is probably part of the fossilization process.

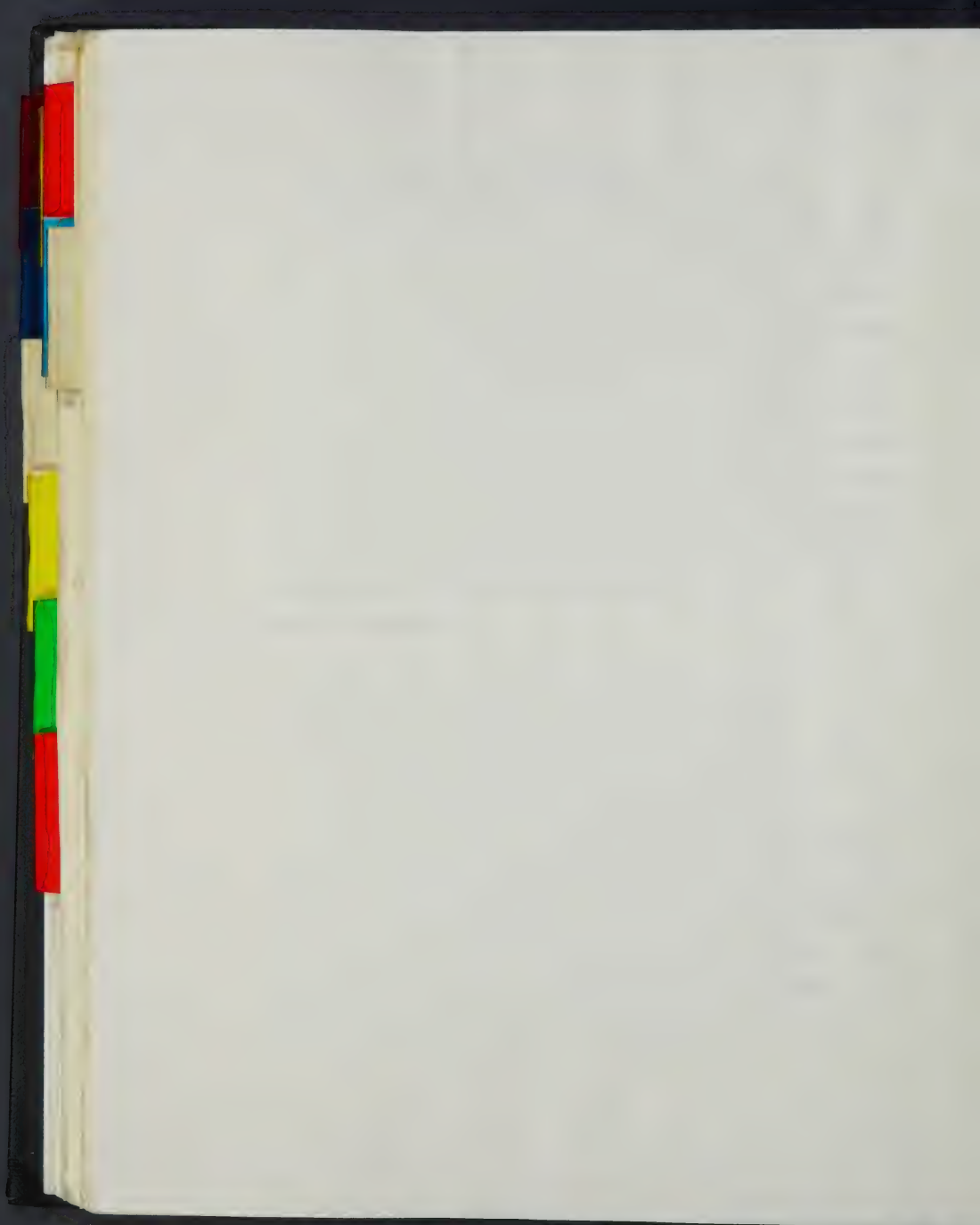
Scale in centimetres.

SK 1587(a)

Radiograph of left mandibular fragment depicted above. Dense petrification of the bone obscures most of the roots of P_3 , P_4 and M_1 . The roots of M_2 are clearly seen, as is its cynodont pulp chamber of restricted height and with widely splayed root canal origins. The constricted "neck" of M_2 at its crown-root junction is another characteristic of a cynodont tooth.

SK (Hom) - Mand.





SK (Hom) - Mand.

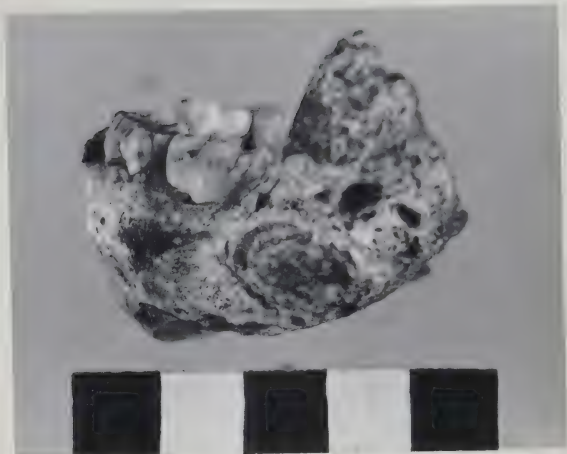
SK 3978

Buccal aspect of the left mandible of a child, containing erupted deciduous teeth. The dm_1 is seen to be worn on its occlusal surface, while the dm_2 is unworn, and presumably newly erupted. An outline of the dental follicle of M_1 is seen embedded in the angle of the body and ramus of the mandible.

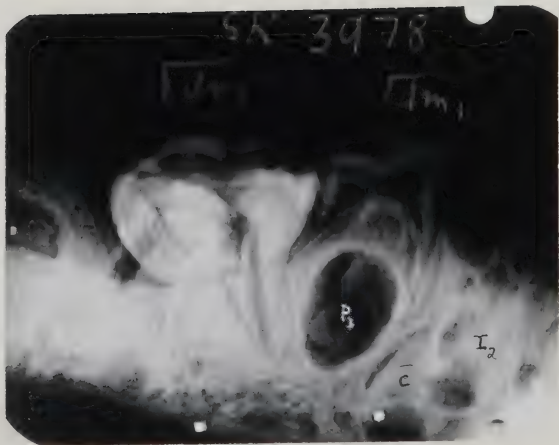
Scale in centimetres.

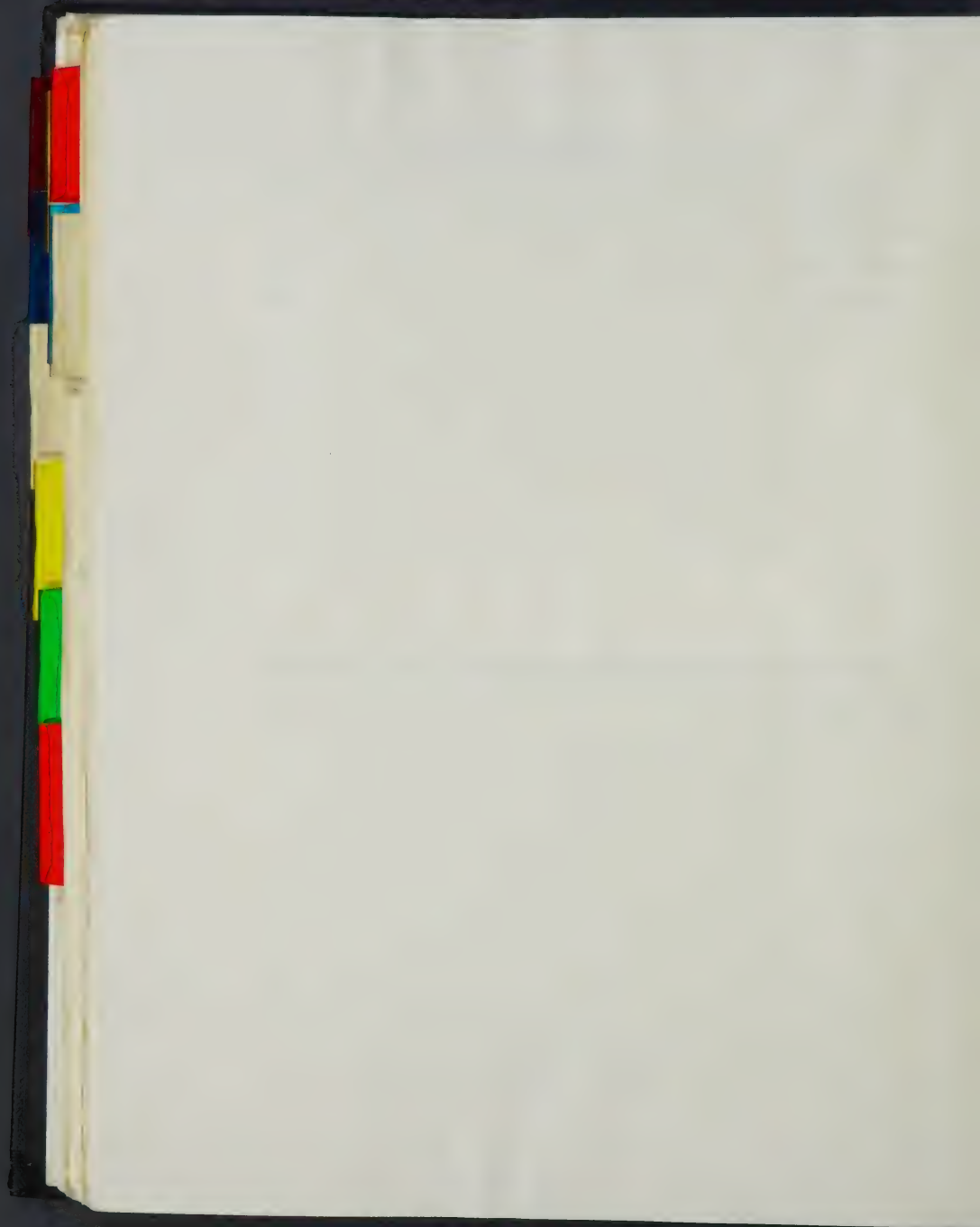
Radiograph of the left mandible containing erupted deciduous molars and early formation of the crowns of the premolars and permanent canine (\bar{C}). The large pulp chamber of dm_1 is clearly evident, and its roots are seen to encompass the forming crown of P_3 .

Magnification: approximately 3x.



SK (Hom) - Mand.





SK (Hom) - Mand.



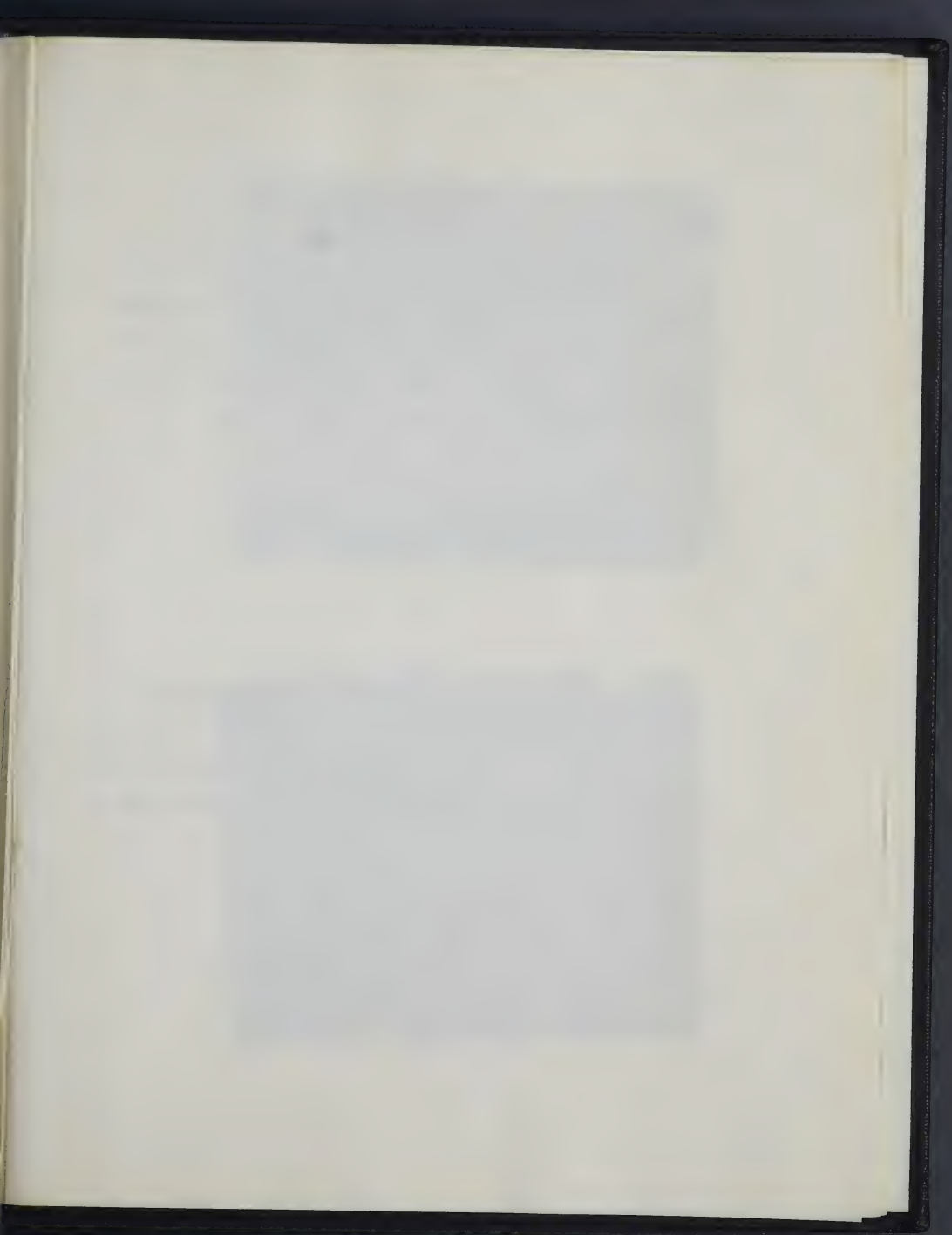
SWARTKRANS HOMININES

Mandibular Teeth

SK 15

SK 45

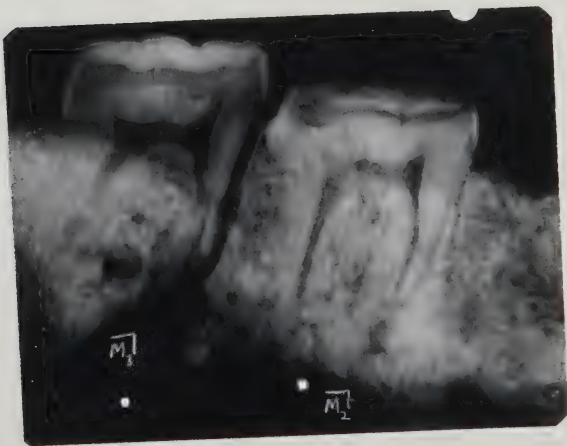
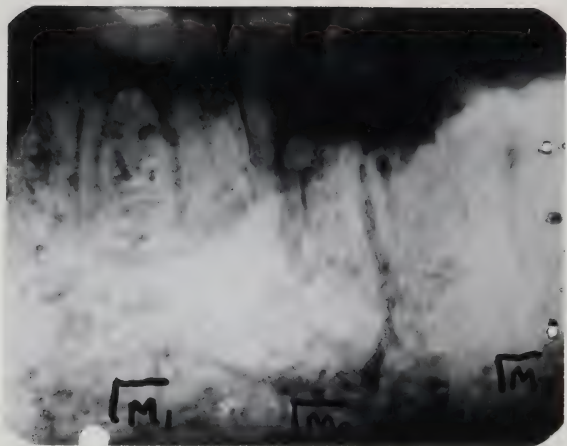


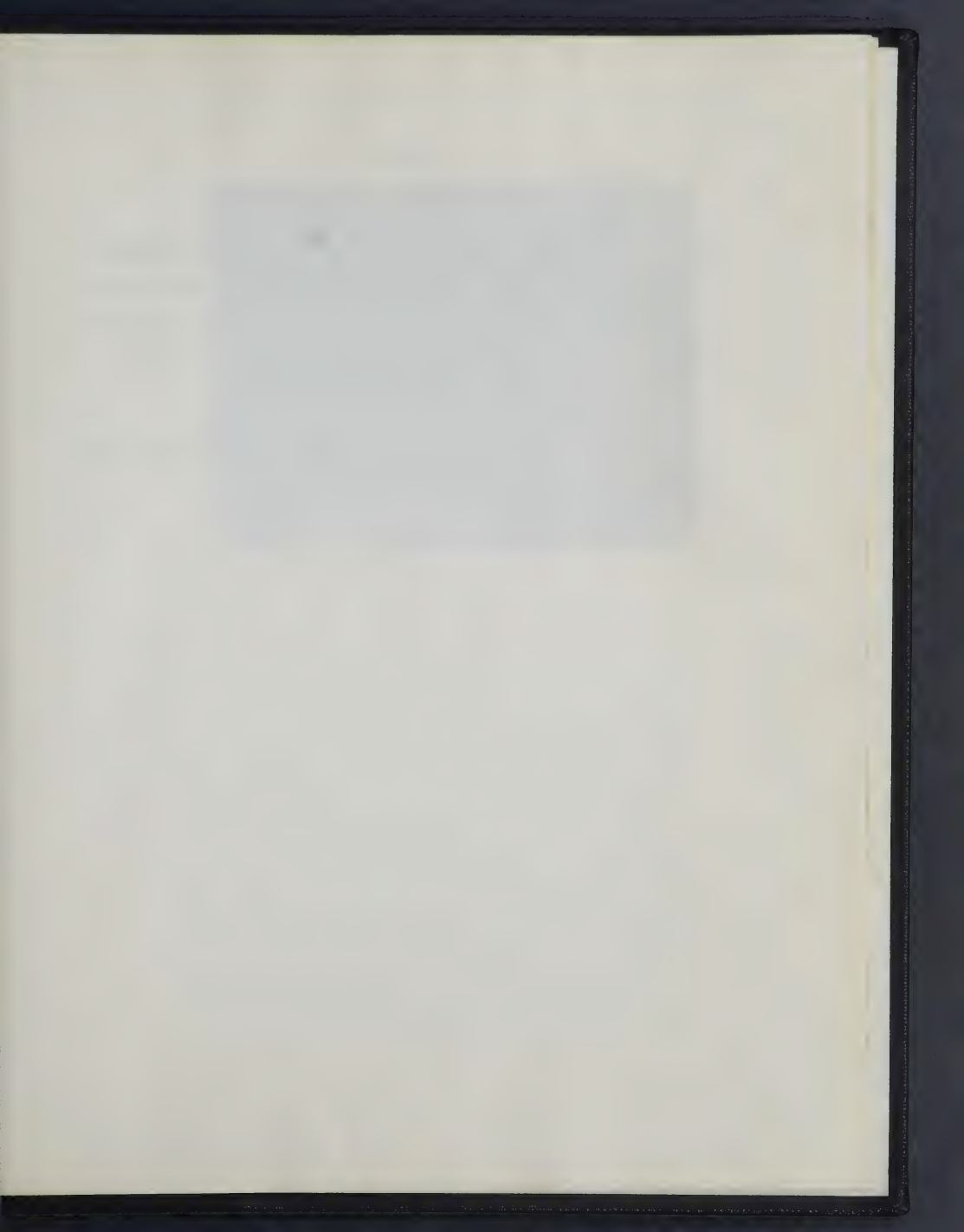


(Homo sp. from Swartkrans)

Radiograph of the $\overline{M_1 M_2 M_3}$ revealing the hypotaurodontic pulp chambers of the molars, and the dense petrification of the alveolar bone. The fracture line passing up through the $\overline{M_2}$ is seen to have removed the midportion of its crown, replaced by a blackened area, corresponding to a filling with plaster on the specimen.

Radiograph of $\overline{M_3 M_2}$, from the buccal aspect revealing moderate attrition of the M_2 . The hypotaurodontic pulp chambers of the molars are evident. The mesial crown surface of the M_2 exhibits a carious lesion. The moderately dense petrification of the mandibular bone is seen to be of a speckled nature.





SK 15

(Homo sp.)

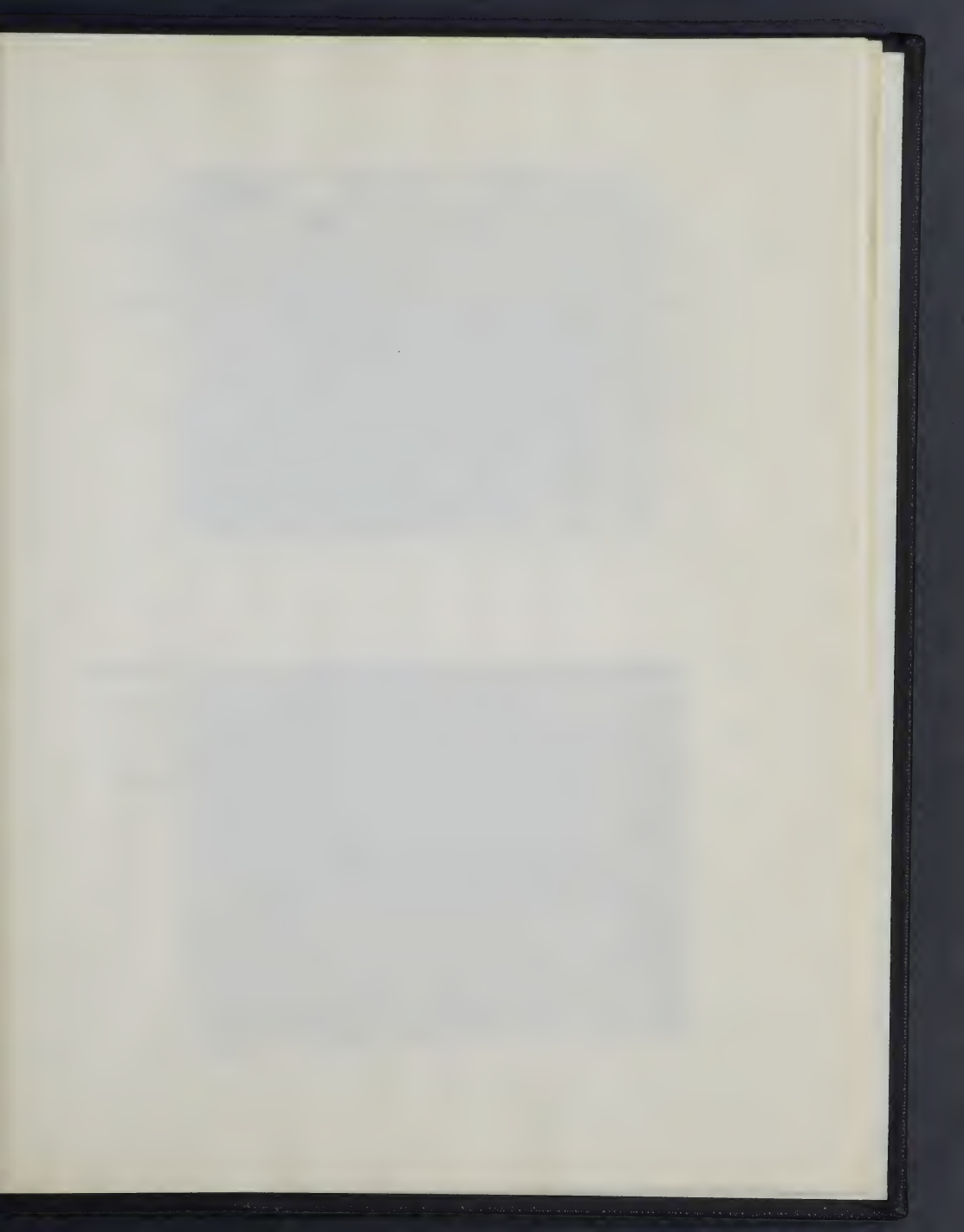
Radiograph from the lingual aspect of the right M_2 and M_3 in situ.

The pulp chambers of both molars are clearly outlined and are seen to be of ~~cynodont~~ ^{hypocynodont} form. Very conspicuous pulp horns project into the mesial and distal cusp areas of both teeth that together with the root canals provide for H-shaped pulp chamber outlines.

Petrifaction of the bone is seen to be irregular, creating the spotty radiolucent areas seen in the mandible.

Magnification: approximately 3x.





SK 45

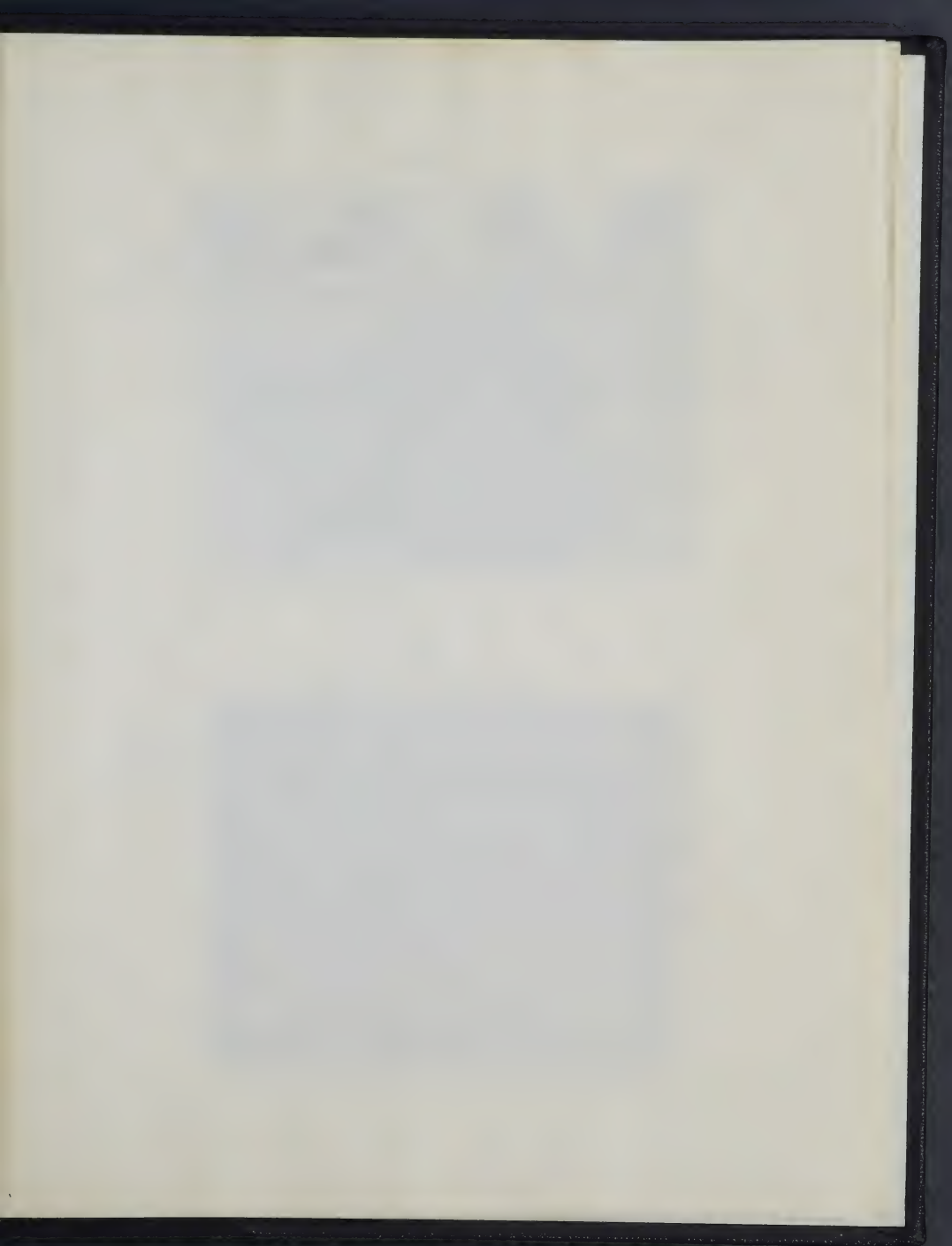
Fragment of the right mandible from the lingual aspect containing the M_1 and M_2 in situ. The lingual aspect of both molars is seen to be generally featureless, and their enamel cervical lines run a straight horizontal course.

Scale in centimetres.

Radiograph of the right mandible from the lingual aspect containing M_1 and M_2 . The severe attritional wear of M_1 is evident, and both molar teeth exhibit attenuated cynodont pulp chambers. The mandibular canal is seen running horizontally below the apices of the roots of M_2 .

Magnification: approximately 3x.





SK 45

Homo Species from Swartkrans

Buccal aspect of right mandibular fragment containing M_1 and M_2 .
The uneven and extreme attrition of these teeth is evident, the M_1
exhibiting the worse wear.

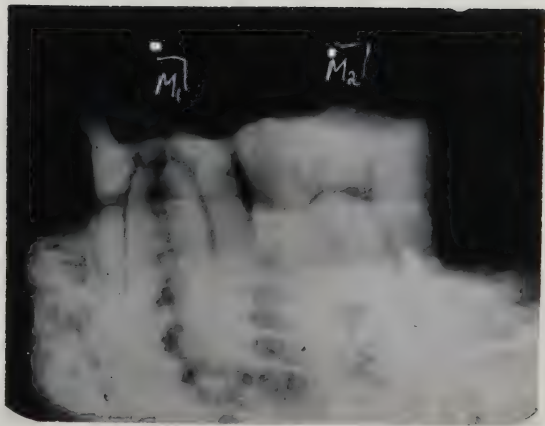
Scale in centimetres.

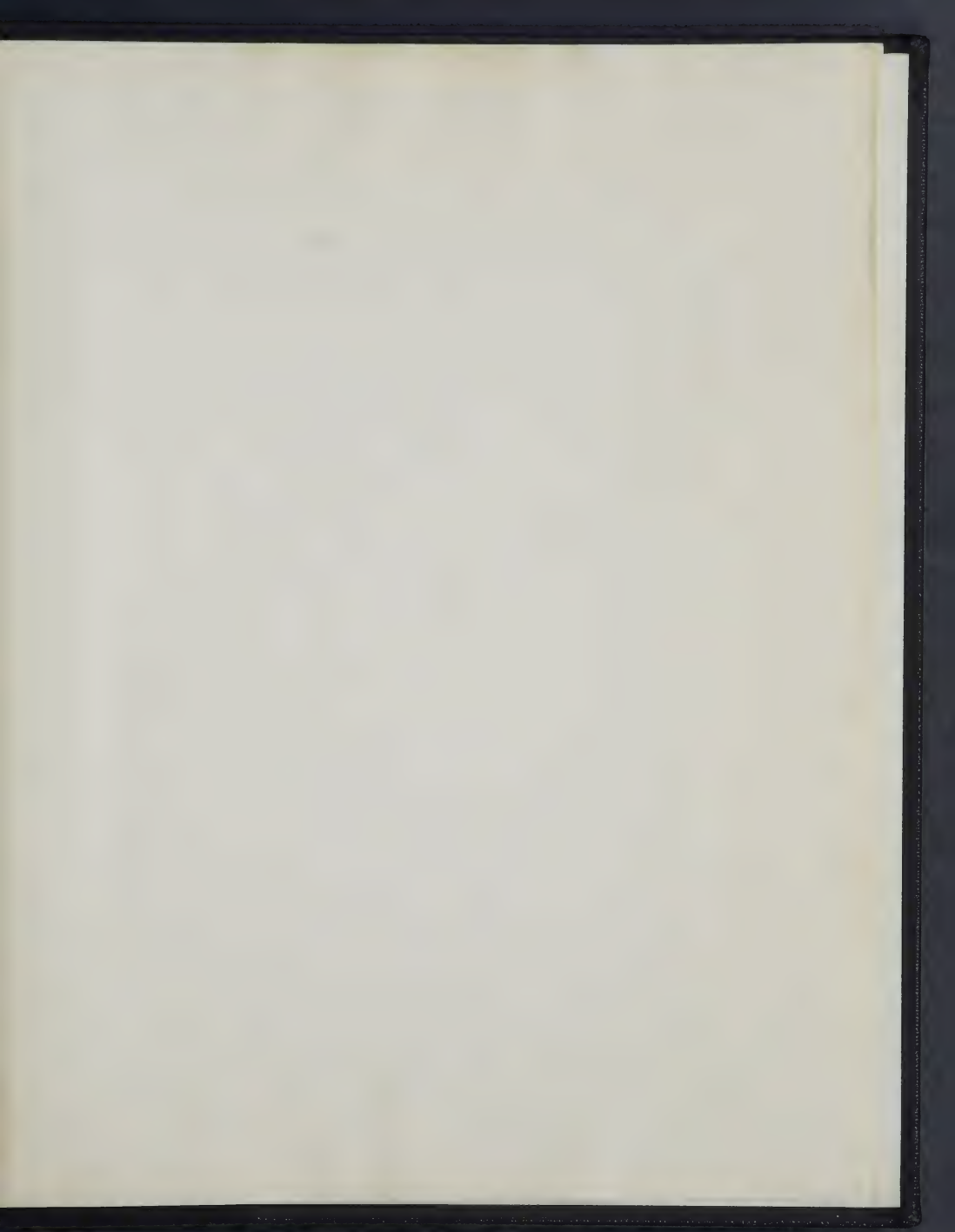
SK 45

Homo Species from Swartkrans

Radiography of right M_1 and M_2 , revealing the attenuated cynodont
form of the pulp chambers. The extreme attrition of M_1 is evident.

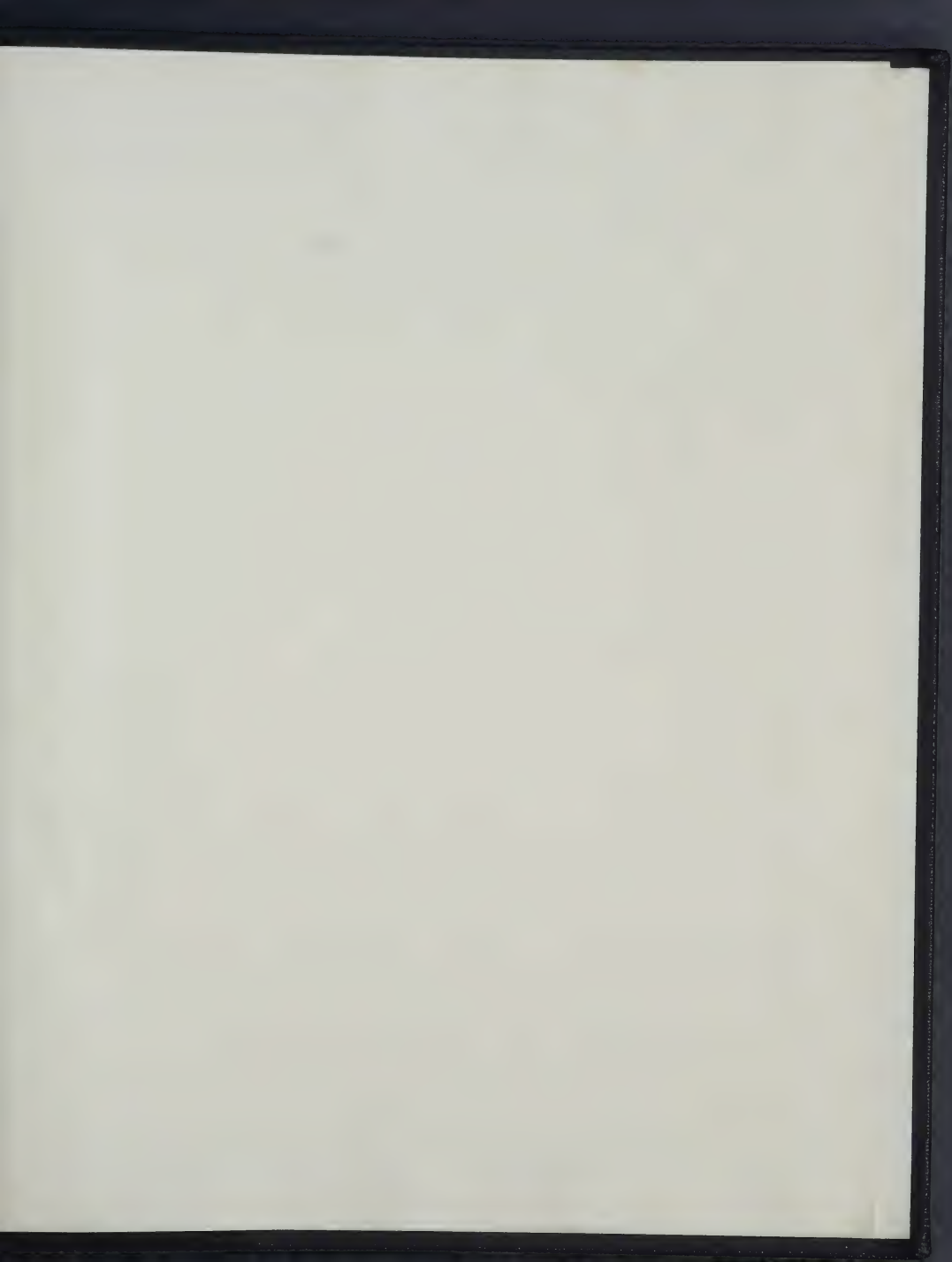
Magnification: approximately 3x.

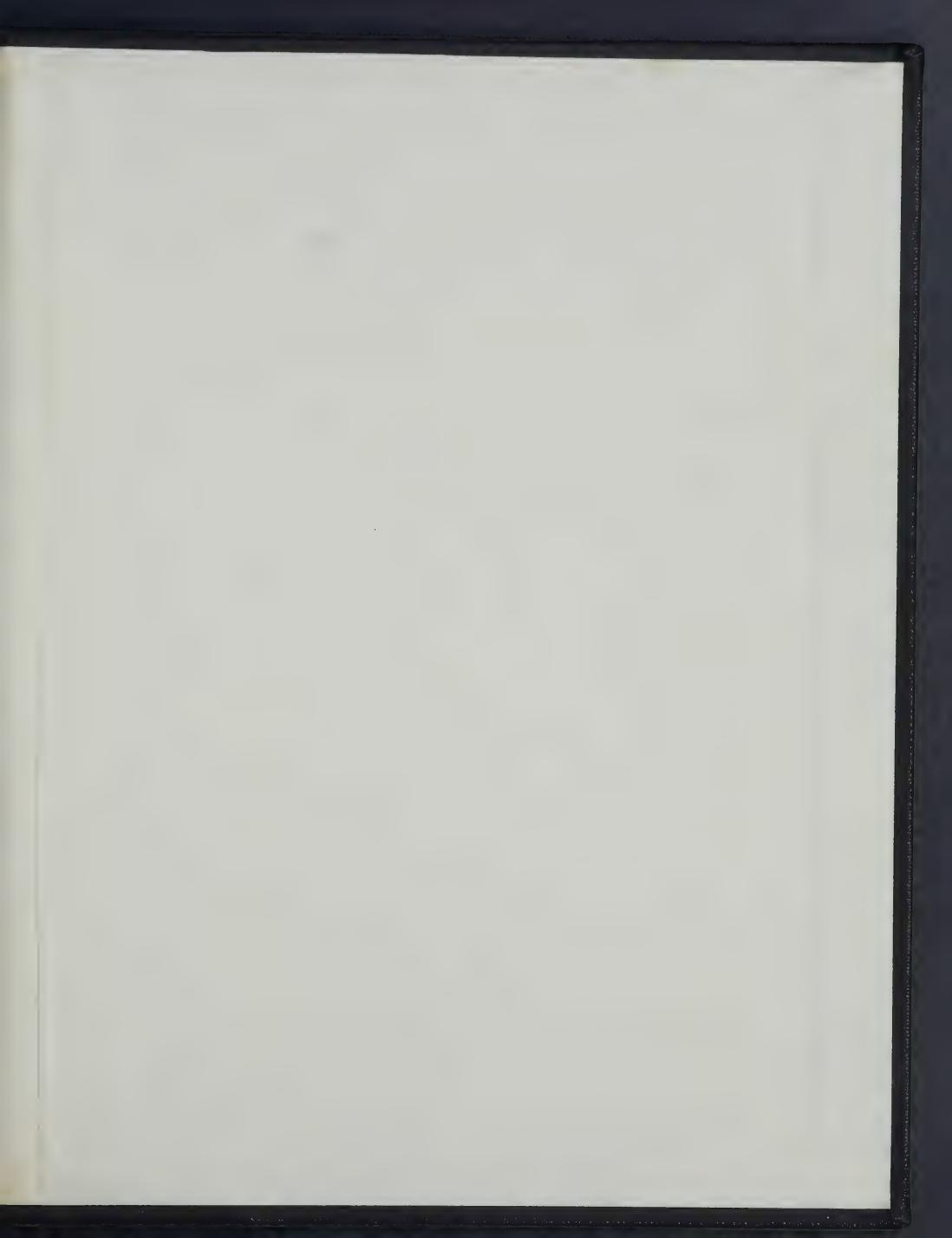


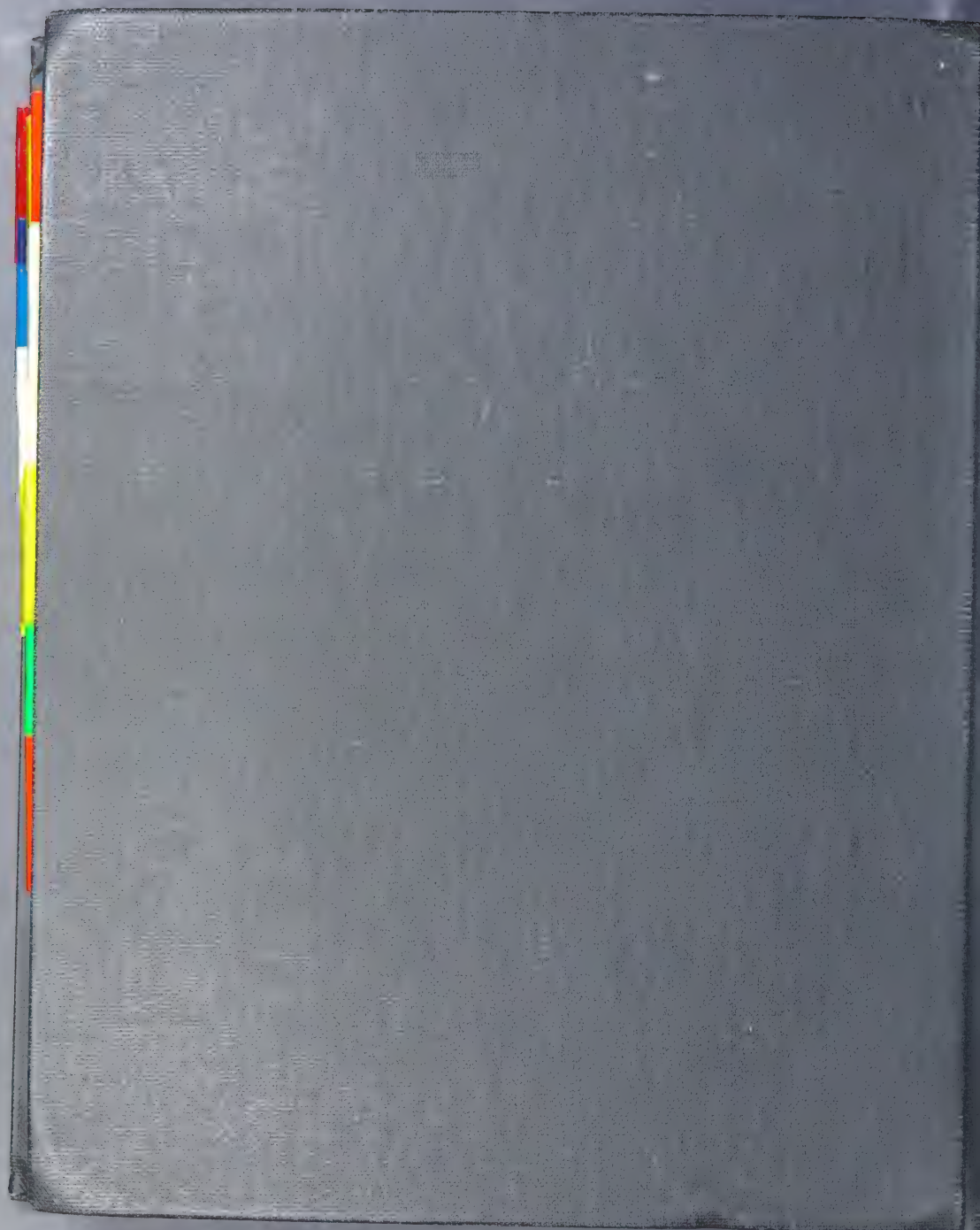












PACIFIC RAILROAD ATLAS
P. 881. 190.
Vol. III

SITE: Rochereil, France.

SPECIMEN: 1945-18 (Magdalenian).

PROVENANCE: Upper Pleistocene, Würm IV, Magdalenian VI.

DESCRIPTION: *Homo sapiens sapiens* immature mandible and cranium (both largely complete but damaged), containing: 7-1(LDI $\bar{1}$)/A8/, 8-1(RDI $\bar{1}$)/A8/, 7-2(LDI $\bar{2}$)/A8/, 8-2(RDI $\bar{2}$)/A8/, 8-3(RD \bar{C})/A8/, 8-4(RDM $\bar{1}$)/A7/, 7-5(LDM $\bar{2}$)/A6/, 8-5(RDM $\bar{2}$)/A6/, 3-1(LI $\bar{1}$)/C3/, 4-1(RI $\bar{1}$)/C3/, 4-2(RI $\bar{2}$)/C2/, 4-3(R \bar{C})/1/, 4-4(RP $\bar{3}$)/1/, 4-5(RP $\bar{4}$)/1/, 4-6(RM $\bar{1}$)/C4/, 3-7(LM $\bar{2}$)/1/, 4-7(RM $\bar{2}$)/1/,
and
6-1(LD $\bar{1}$)/A7/, 5-1(RDI $\bar{1}$)/A7/, 6-2(LDI $\bar{2}$)/A7/, 5-2(RDI $\bar{2}$)/A7/, 6-3(LD \bar{C})/A6/, 6-4(LDM $\bar{1}$)/A7/, 5-4(RDM $\bar{1}$)/A7/, 6-5(LDM $\bar{2}$)/A7/, 5-5(RDM $\bar{2}$)/A7/, 2-1(LI $\bar{1}$)/C3/, 1-1(RI $\bar{1}$)/C3/, 2-2(LI $\bar{2}$)/1/, 1-2(RI $\bar{2}$)/C2/, 2-3(L \bar{C})/C2/, 1-3(R \bar{C})/C2/, 2-4(LP $\bar{3}$)/1/.

DENTAL AGE: 2.8 (1.9-3.0), 2.9 (2.7-3.1) years.

COMMENT: This specimen contains the normal number of teeth for its age, except for postmortem losses. Further postmortem phenomena are the sagittal displacement of the left mandibular corpus at the missing 7-4, the radio-opaque foreign body in crypt of 3-6, and probably the lingual tilt of 8-4 and 8-5.

- : The mandibular deciduous anterior teeth are remarkably anomalous. This is evidenced by the rectangular cervical profile in lingual view of 7-1 and 8-1 and most especially, by the reversed gradient in tooth size from mesial to distal in these three teeth, both sides, culminating in extremely small deciduous canines (best seen in view "e").
- : Bouvier (1971 cited in Meiklejohn 1974) has questioned the association of the mandible with the cranium. Supporting their association here are the compatible states of dental formation and the anomalous nature of both portions. As noted, the anterior mandibular deciduous dentition is peculiar while the cranium shows frontal trepanning combined with a virtually adult-sized neurocranial vault (Skinner 1978), both features suggesting hydrocephaly.

VIEW: (Mandible) a) O.; b) L., symphysis; c) B., 7-5; d) B., left molar area; e) B., right premolar area; f) B., right molar area.

(Maxillae) g) external towards nasal area so that specimen's left is to right; h) L., left incisor area; i) L., left premolar area; j) L., right incisor area; k) B., and from somewhat below, right premolar area; l) L., right premolar area.

LOCATION OF ORIGINAL:

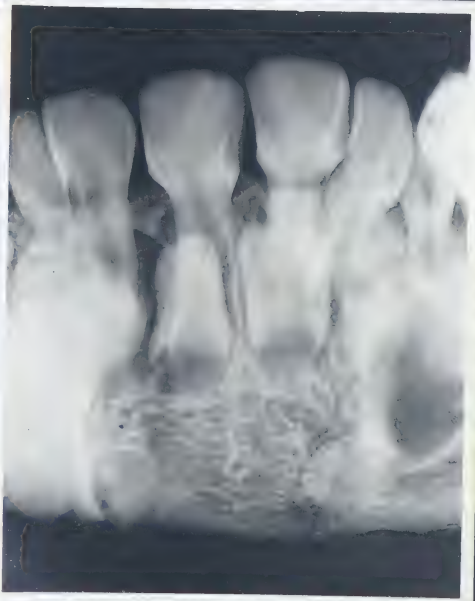
L'Institut de Paléontologie Humaine, 1, Rue René Panhard,
Paris - 13^e, France.

Rochereil 1945-18, France

a



b

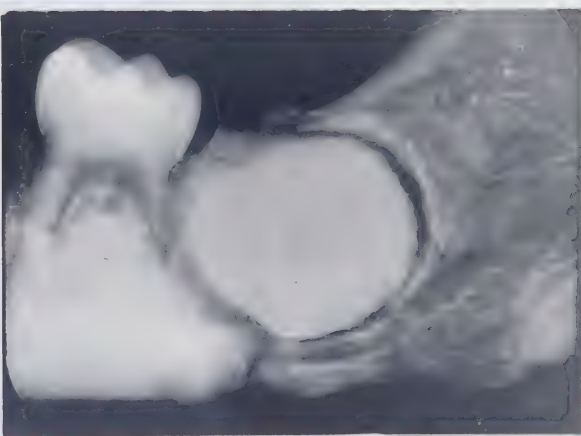


Rochereil 1945-18, France

c

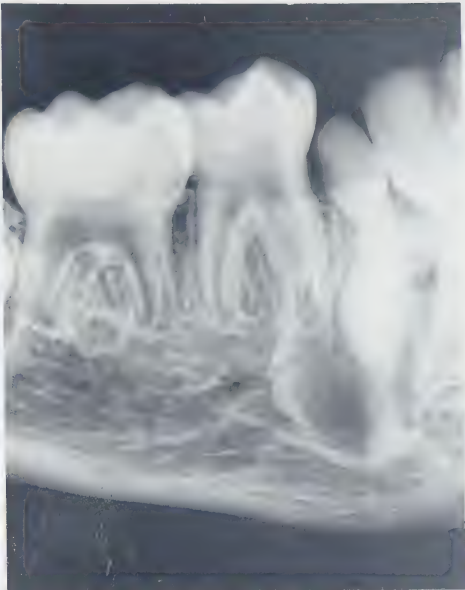


d

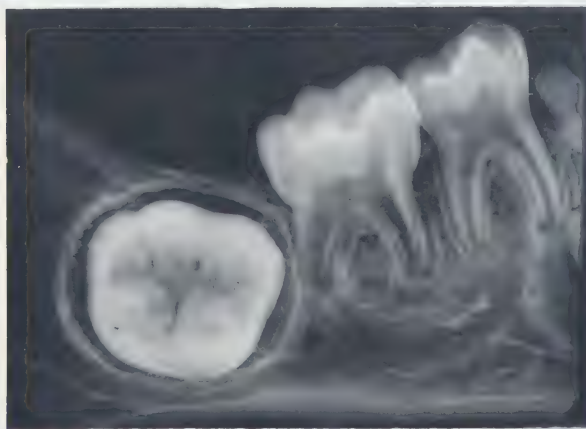


Rochereil 1945-18, France

e

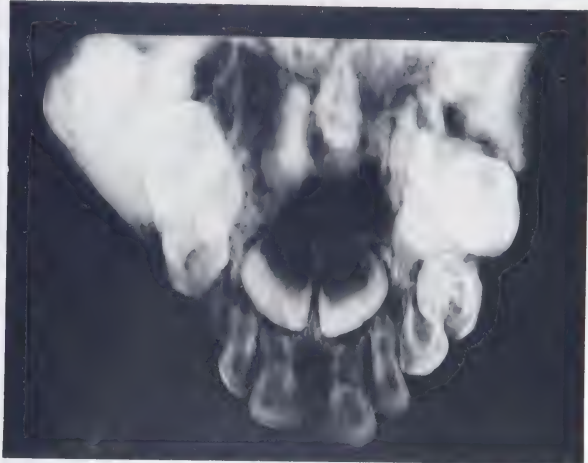


f

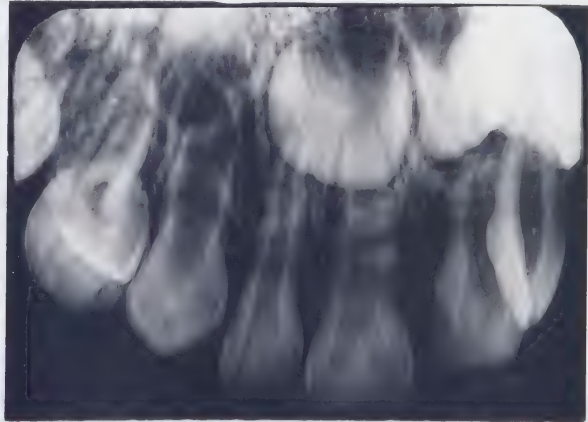


Rochereil 1945-18, France

g

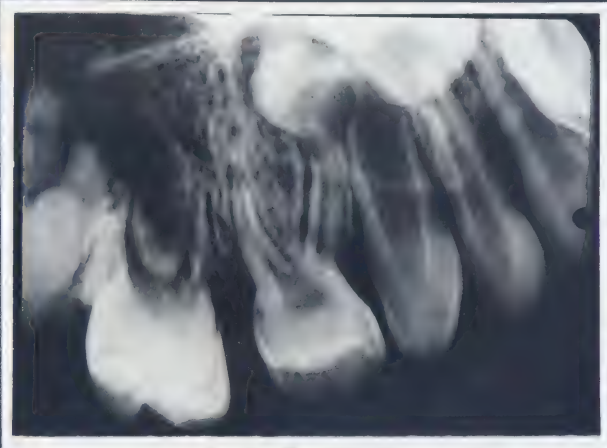


h

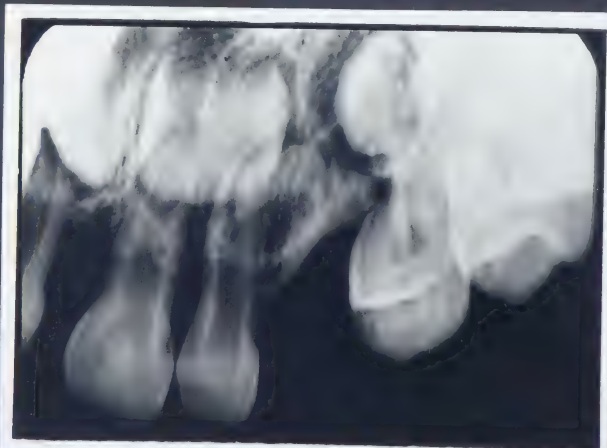


Rochereil 1945-18, France

i



j



Rochereil 1945-18, France

k



l

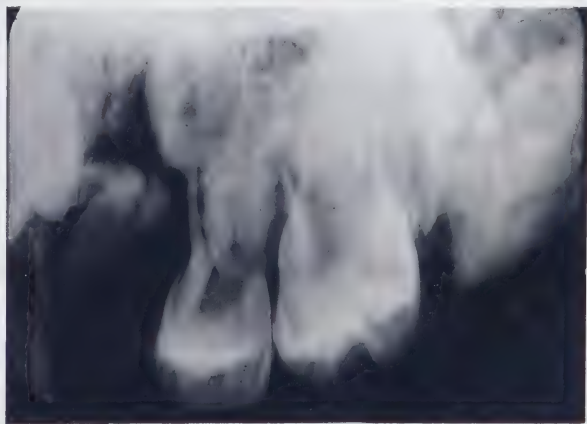


Fig. a-c

SITE: Les Roches, France.

SPECIMEN: 53.14.3.

PROVENANCE: Upper Pleistocene, Würm III, Aurignacian.

DESCRIPTION: *Homo sapiens sapiens* immature right mandibular corpus,
fragment, containing: 8-5(RDM2)/A8/, 4-4(RP3)/C4/,
4-5(RP4)/C3/, 4-6(RMT)/B6/.

DENTAL AGE: 6.2 (5.1-6.5), 5.9 (5.3-6.0) years.

COMMENT: Root formation for 4-6 was judged not from the tooth but
from the alveolus.

: Despite 8-5 having been in occlusion for some three years
at least and 4-6 having almost certainly attained gingival
eruption there is only cusp facetting on the former and no
attrition or abrasion on the latter. (See accompanying
photographs.)

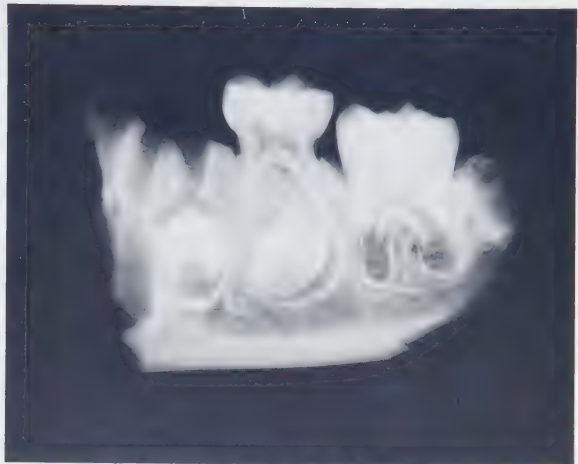
VIEW: a) L., right premolar area; b) B.; c) L.

LOCATION OF ORIGINAL:

Musées de la Ville de Bourges, Conservation: 4-6 Rue des
Arènes, Bourges, Poste 343, France. (Photographs supplied
by J. Faviere.)

Les Roches 53.14.3, France

a



b



Les Roches 53.14.3, France

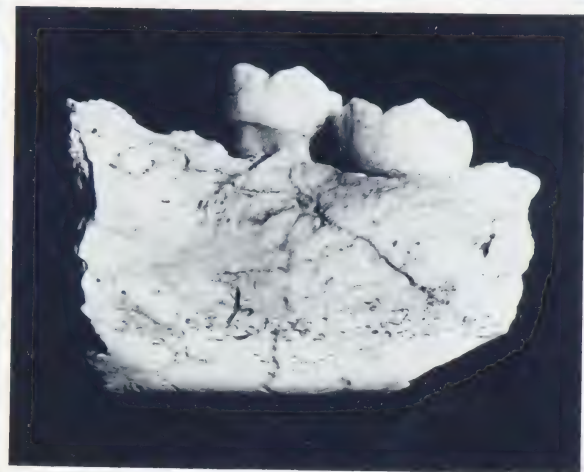


Fig.

SITE: Saint-Germain-La-Rivière, France.

SPECIMEN: 1970-8, B 5.

PROVENANCE: Upper Pleistocene, Würm IV, Upper Magdalenian (III); Upper Magdalenian without harpoons (Bouvier 1971 in Meiklejohn 1974).

DESCRIPTION: *Homo sapiens sapiens* immature left mandibular corpus,
containing: 7-3(LD \overline{C})/A8/, 7-4(LDM $\overline{1}$)/A8/, 7-5(LDM $\overline{2}$)/A8/,
3-1(LIT)/C5/, 3-2(LI $\overline{2}$)/C5/, 3-3(L \overline{C})/C4/, 3-4(LP $\overline{3}$)/C3/,
3-6(LMT)/A6/.

DENTAL AGE: 5.5 (5.1-6.5), 5.1 (4.2-5.6) years.

COMMENT: There is, in all likelihood, agenesis of 3-5 coupled with accelerated eruption of 3-6 relative to the incisors.

VIEW: L., left corpus.

LOCATION OF ORIGINAL:

L'Institut de Paléontologie Humaine, 1, Rue René Panhard,
Paris - 13^e, France.

Saint-Germain-La-Riviere B 5, France



Fig. a-b

SITE: Saint-Germain-La-Rivière, France.

SPECIMEN: 1970-8, B 6 (right) and B 7 (left).

PROVENANCE: Upper Pleistocene, Würm IV, Upper Magdalenian (III), *vide supra*.

DESCRIPTION: *Homo sapiens sapiens* immature left and right maxillae (damaged), containing: 6-4(LDM₁)/A8/, 5-4(RDM₁)/A8/, 6-5(LDM₂)/A8/, 5-5(RDM₂)/A8/, 2-3(L^C)/C4/, 1-3(R^C)/C4/, 2-4(LP³)/C3/, 1-4(RP³)/C3/, 2-6(LM¹)/A6/, 1-6(RM¹)/A6/.

DENTAL AGE: 5.5 (5.1-6.5), 5.1 (4.2-5.6) years.

COMMENT: Compare this figure with the previous figure showing the mandible of a similarly-aged child from the same site. Again, there seems to be agenesis of the fourth premolar (2-5, 1-5), although one could interpret the radiolucency apical to the roots of 6-5 and 5-5 as an early stage of crypt formation prior to mineralization of the crown of an extremely retarded successional tooth. This seems unlikely.

: B 5, B 6 and B 7 probably represent a single individual.

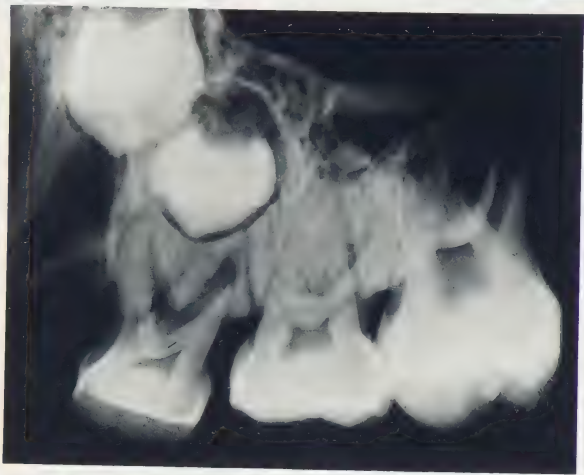
VIEW: a) L., right premolar area; b) L., left premolar area.

LOCATION OF ORIGINAL:

L'Institut de Paléontologie Humaine, 1, Rue René Panhard,
Paris - 13^e, France.

Saint-Germain-La-Riviere B 6&7, France

a



b



Fig. a-e

SITE: Saint-Germain-La-Rivière, France.

SPECIMEN: 1970-8, B 3.

PROVENANCE: Upper Pleistocene, Würm IV, Upper Magdalenian (III), *vide supra*.

DESCRIPTION: *Homo sapiens sapiens* immature mandible, complete back to empty crypts of 3-7 and 4-7 but with considerable reconstruction in left corpus, containing: 7-3(LD \bar{C})/A8/, 8-3(RD \bar{C})/A8/, 7-4(LDM \bar{T})/A8/, 8-4(RDM \bar{T})/A8/, 7-5(LDM \bar{Z})/A8/, 8-5(RDM \bar{Z})/A8/, 3-1(LIT)/A7/, 4-1(RIT)/A8/, 3-2(LI \bar{Z})/A7/, 4-2(RI \bar{Z})/A7/, 4-3(R \bar{C})/C5/, 4-4(RP $\bar{3}$)/C5/, 4-5(RP $\bar{4}$)/C4/, 3-6(LMT)/A7/, 4-6(RMT)/A7/.

DENTAL AGE: 7.4 (6.9-7.7), 6.9 (6.5-7.1) years.

COMMENT: Note features indicating that deciduous teeth have been functional for some time: loss of crown height through attrition and abrasion, diminution of pulp cavities and distal root resorption on 7-4 and 8-4. X

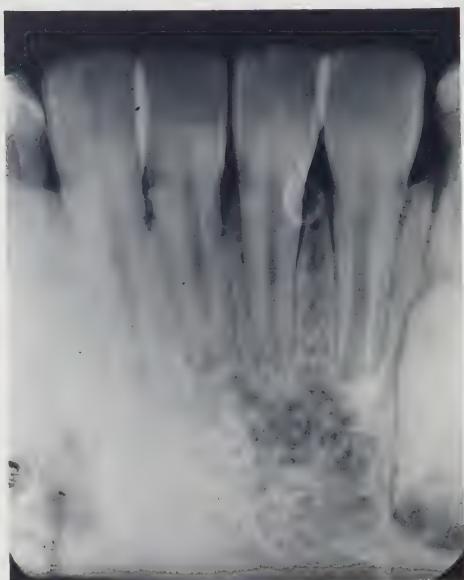
: Radiolucency on 8-3 is postmortem damage.

VIEW: a) L., symphysis; b) B., left premolar area; c) B., left molar area; d) B., right premolar area; e) B., right molar area.

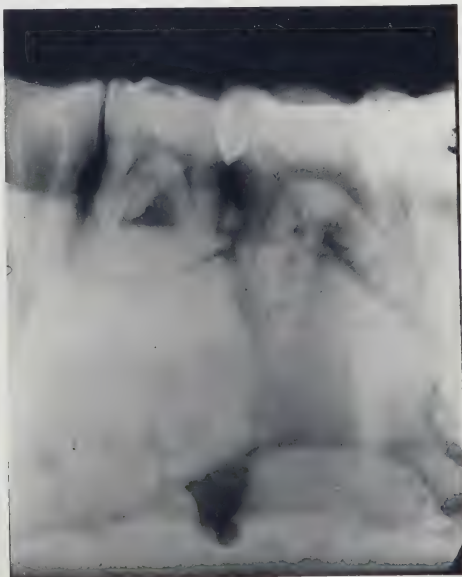
LOCATION OF ORIGINAL:

L'Institut de Paléontologie Humaine, 1, Rue René Panhard,
Paris - 13^e, France.

a

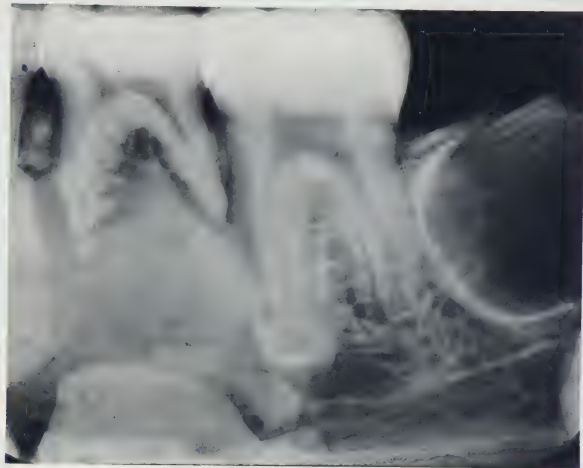


b



Saint-Germain-La-Riviere B 3, France

c



d



Saint-Germain-La-Rivière B 3, France

47

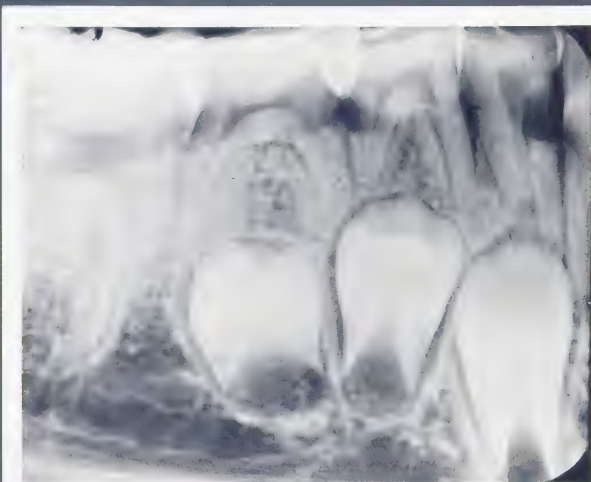


Fig. a-e

SITE: Saint-Germain-La-Rivière, France.

SPECIMEN: 1970-8, B 4.

PROVENANCE: Upper Pleistocene, Würm IV, Upper Magdalenian (III), *vide supra*.

DESCRIPTION: *Homo sapiens sapiens* immature mandible, somewhat damaged but complete back to 3-7 and 4-7, containing: 7-4(LDMT)/A8/, 8-4(RDMT)/A8/, 7-5(LDMZ)/A8/, 8-5(RDMZ)/A8/, 3-1(LIT)/A/, 4-1(RIT)/A8/, 3-2(LIZ)/A8/, 4-2(RIZ)/A/, 3-3(LC)/C6/, 4-3(RC)/C6/, 3-4(LP3)/C5/, 4-4(RP3)/C5/, 3-5(LP4)/C4/, 4-5(RP4)/C4/, 3-6(LMT)/A8/, 4-6(RMT)/A8/, 3-7(LMZ)/C4/, 4-7(RMZ)/C4/.

DENTAL AGE: 8.5 (8.1-9.6), 8.1 (8.0-8.8) years.

COMMENT: This individual exhibits a number of interesting dental conditions, particularly the unusual alignment of 4-3 which in view "d" appears to have been its "in vivo" disposition. There is pronounced enamel hypoplasia lingually and buccally on all four incisors (not evidenced in 3-6 or 4-6) and enamel pitting on exposed buccal surfaces of 3-4 and 4-4 (not visible radiographically). These suggest two episodes of physiological stress. In addition, one can see considerably more dental attrition on 7-4 and 7-5 than on their isomeres.

VIEW: a) L., symphysis; b) B., left premolar area; c) B.,
 left molar area; d) B., right premolar area; e) B.,
 right molar area.

LOCATION OF ORIGINAL:

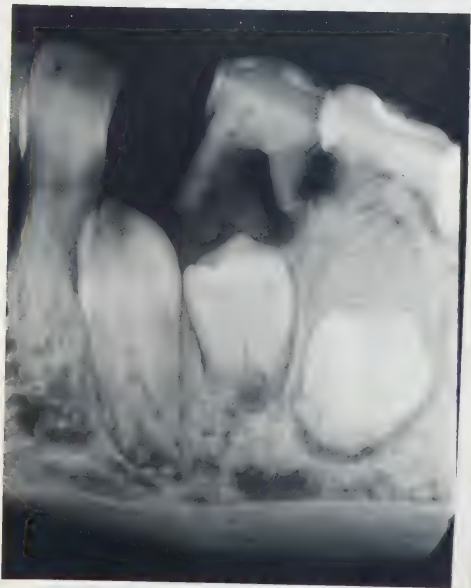
L'Institut de Paléontologie Humaine, 1, Rue René Panhard,
Paris - 13^e, France.

Saint-Germain-La-Riviere B 4, France

a

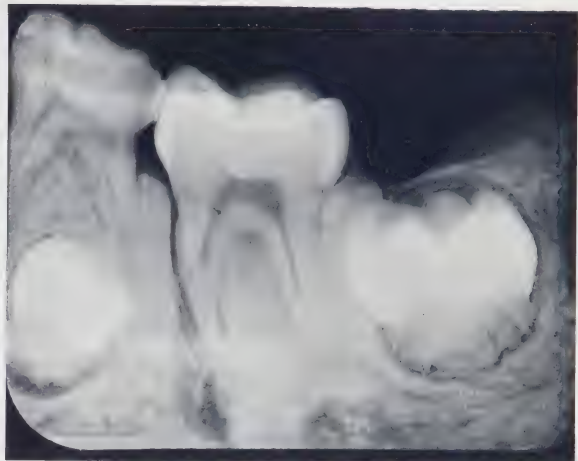


b



Saint-Germain-La-Riviere B 4, France

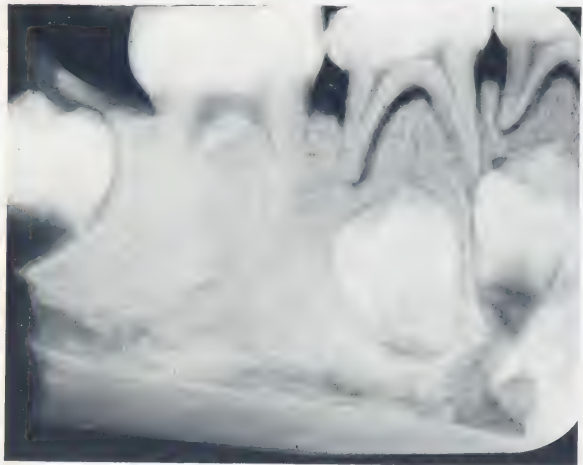
c



d



Saint-Germain-La-Riviere B 4, France



SITE: Solutré, France.

SPECIMEN: 1956-49, 671, 1868.

PROVENANCE: A supposed Aurignacian date (cat. desc.) for this specimen has been dismissed by Riquet, who feels Medieval is more reasonable (1974, pers. comm.; and see discussion in CFH II: 178).

DESCRIPTION: *Homo sapiens sapiens* immature mandible (complete), containing 8-2/3(RDI $\overline{2}$ /D \overline{C}) (fused) /A8/, 7-4(LDM $\overline{1}$)/A8/, 7-5(LDM $\overline{2}$)/A8/, 8-5(RDM $\overline{2}$)/A8/, 3-1(LI $\overline{1}$)/C5/, 4-1(RI $\overline{1}$)/C5/, 3-2(LI $\overline{2}$)/C5/, 4-2(RI $\overline{2}$)/C5/, 3-3(L \overline{C})/C4/, 3-4(LP $\overline{3}$)/C3/, 4-4(RP $\overline{3}$)/C3/, 3-5(LP $\overline{4}$)/C3/, 4-5(RP $\overline{4}$)/C3/, 3-6(LMT)/C6/, 4-6(RMT)/C6/, 3-7(LM $\overline{2}$)/C3/, 4-7(RM $\overline{2}$)/C3/.

DENTAL AGE: 5.6 (5.1-6.3), 5.1 (4.0-6.5) years.

COMMENT: Disregarding the dubious antiquity of this specimen and the interesting association of fusion of 8-2 and 8-3 with agenesis of 4-2 and unusual positioning of 4-2 and 4-3 relative to their isomeres, these radiographs are instructive in that they show the not-uncommon inversion in skeletal remains of posterior dental germs in their crypts and profuse radiopacity derived from the preservatives applied to postmortem breaks at 3-6 and 4-6 and not from groundwater mineralization.

VIEW: a) L., symphysis; b) B., left premolar area; c) B.,
left molar area; d) B., right premolar area; e) B.,
right molar area.

LOCATION OF ORIGINAL:

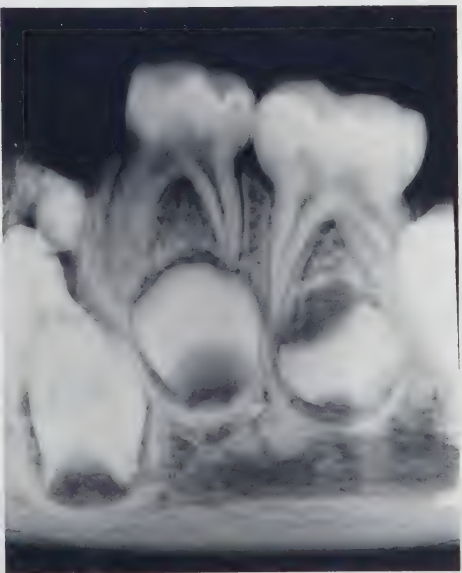
L'Institut de Paléontologie Humaine, 1, Rue René Panhard,
Paris - 13^e, France.

Solutre 1956-49, France

a



b



Solutre 1956-49, France

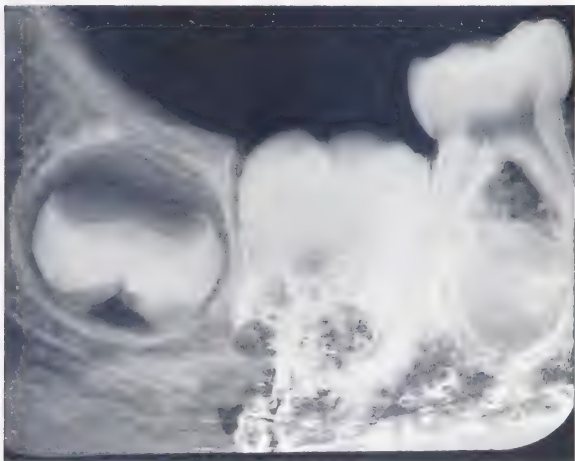
c



d



Solutre 1956-49, France



BELGIUM

Fig. a-m

SITE: Engis, Belgium.

SPECIMEN: Engis 2 (CFH II: 7).

PROVENANCE: Upper Pleistocene, Würm, Aurignacian and Mousterian.

DESCRIPTION: *Homo sapiens neanderthalensis* immature fragmentary cranium and anterior portions of maxillae, with loose upper and lower teeth: 8-4(RDM¹)/8, 7-5(LDM²)/7/, 3-6(LMT)/5/,

and

6-1(LDI¹)/A8/, 5-2(RDI²)/A8/, 6-3(LD^C)/A8/, 5-3(RD^C)/A8/,
6-4(LDM¹)/8/, 5-5(RDM²)/7/, 2-1(LI¹)/C4/, 1-1(RI¹)/C4/,
2-2(LI²)/C3/, 1-2(RI²)/C3/, 2-3(L^C)/C3/, 1-3(R^C)/C3/,
2-4(LP³)/C2/, 1-4(RP³)/C2/, 2-6(LM¹)/4/.

DENTAL AGE: 3.6 (2.9-4.1), 3.6 (3.2-4.0) years.

COMMENT: Although unrecognized as such at the time this specimen found by P.C. Schmerling (1829-30) was the first fossil hominid ever recovered.

VIEW: a) L., 8-4; b) M., 8-4; c) B., 7-5; d) M., 7-5;
e) B-L., 3-6; f) L.; g) L., left incisor area;
h) L., right incisor area; i) L., 6-4; j) M., 6-4;
k) L., 5-5; l) M., 5-5; m) B-L., 2-6.

LOCATION OF ORIGINAL:

Radiographs courtesy of R. Eisenring and G. Ubaghs,
Laboratoire de Paléontologie Animale, Université de Liège,
7, Place du Vingt-Aout, Liège, B 4000, Belgique.

Engis 2, Belgium

a



b



Engis 2, Belgium

c



d

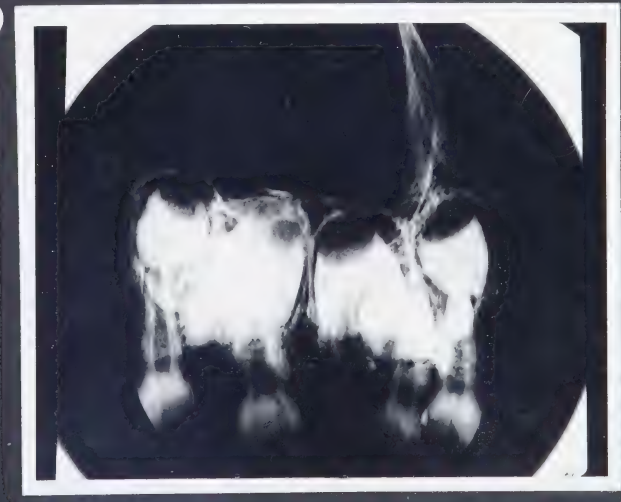


Engis 2, Belgium

e

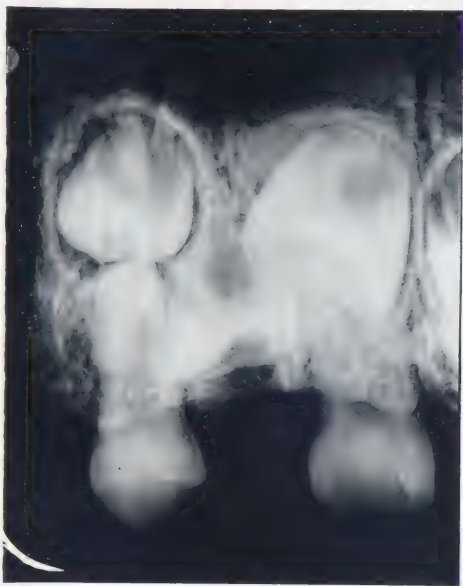


f



Engis 2, Belgium

g



h



Engis 2, Belgium

i



j

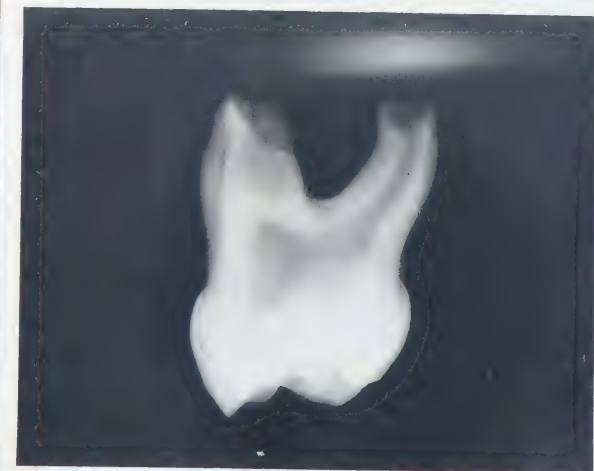


Engis 2, Belgium

k

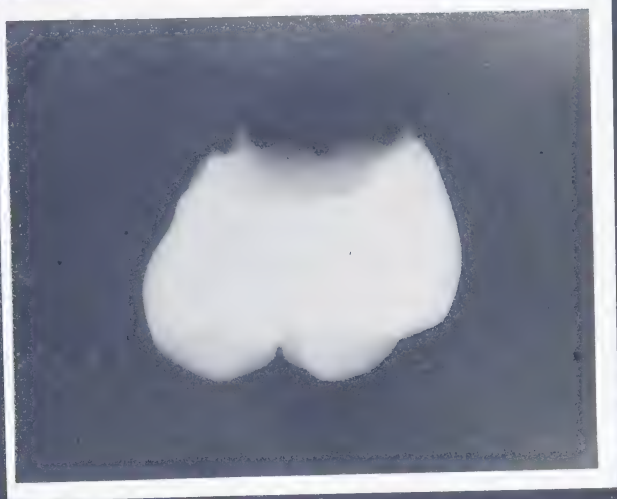


l



Engis 2, Belgium

PI



BRITISH ISLES

Fig. a-f

SITE: Badger Hole, England.

SPECIMEN: 227 31.

PROVENANCE: Upper Pleistocene, Mid-Würm (Middle Weichselian), Early
Upper Paleolithic, Proto-Solutrean, > 18,000 B.P. (BM-497)
A3-C14 charred bone layer I (CFH II: 20).

DESCRIPTION: *Homo sapiens sapiens* immature mandible sans rami, containing:
7-4(LDM $\overline{1}$)/A8/, 8-4(RDM $\overline{1}$)/A8/, 7-5(LDM $\overline{2}$)/A8/, 8-5(RDM $\overline{2}$)/A8/,
3-1(LIT)/C5/, 4-1(RIT)/C5/, 3-2(LI $\overline{2}$)/C4/, 4-2(RI $\overline{2}$)/C4/,
3-3(L \overline{C})/C4/, 4-3(R \overline{C})/C4/, 3-4(LP $\overline{3}$)/C3/, 4-4(RP $\overline{3}$)/C3/,
3-5(LP $\overline{4}$)/C2/, 4-5(RP $\overline{4}$)/C2/.

DENTAL AGE: 4.4 (3.7-4.9), 4.2 (3.4-4.8) years.

COMMENT:

VIEW: a) O.; b) L., symphysis; c) L., 3-3 area; d) B.,
left premolar area; e) L., 4-3 area; f) B., right
premolar area.

LOCATION OF ORIGINAL:

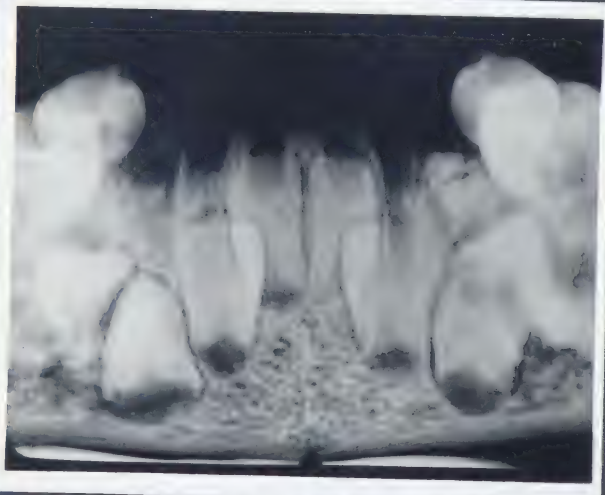
The Museum, Wells, Somerset, BA5 2UE, U.K.

Badger Hole 227 31, England

a

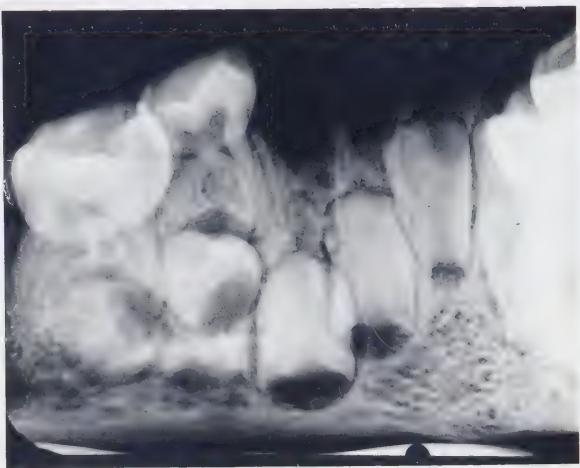


b

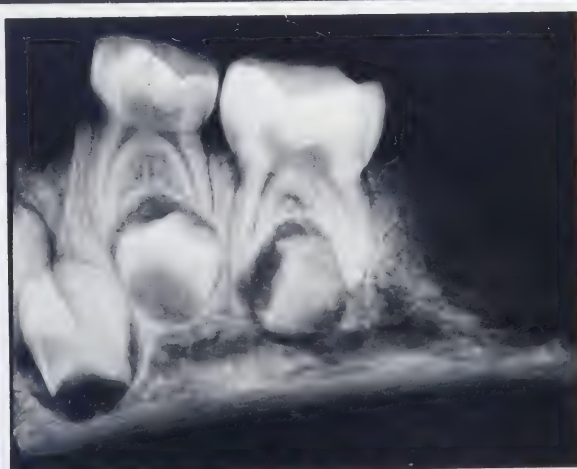


Badger Hole 227 31, England

c

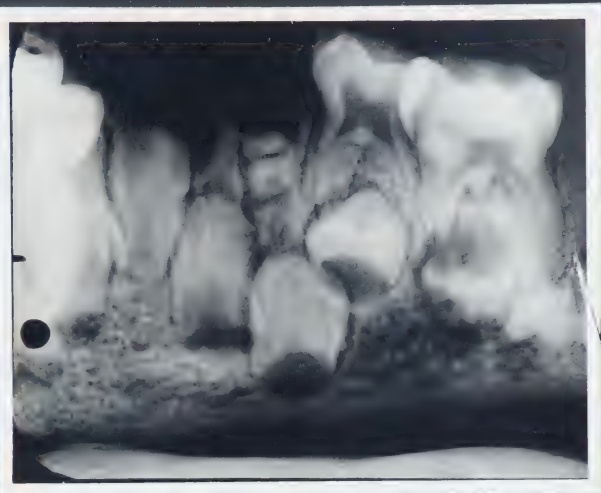


d



Badger Hole 227 31, England

e



f

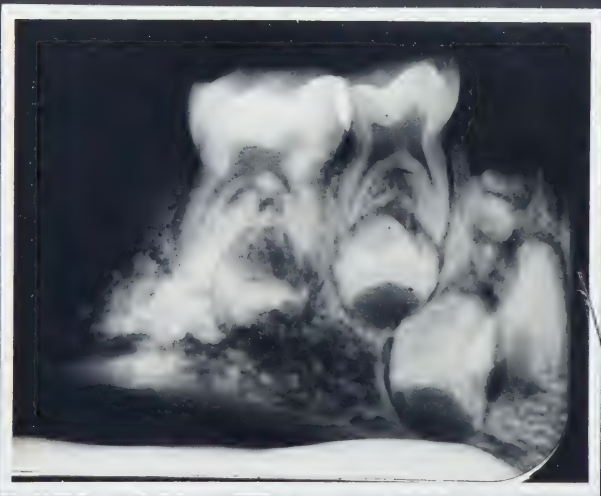


Fig. a-c

SITE: Badger Hole, England.

SPECIMEN: 226 30.

PROVENANCE: Upper Pleistocene, Mid-Würm (Middle Weichselian), Early
Upper Paleolithic, Proto-Solutrean, > 18,000 B.P. (BM-497)
A3-C14 charred bone layer I (CFH II: 20).

DESCRIPTION: *Homo sapiens sapiens* immature symphysis and right mandibular
corpus (severely abraded), containing: 4-3(RC̄)/C6/,
4-4(RP3̄)/C5/, 4-5(RP4̄)/C5/, 4-7(RM2̄)/C4/.

DENTAL AGE: 8.7 (7.6-9.6), 8.4 (7.5-9.0) years.

COMMENT: A distinct circular radiolucency evident in each radiograph
is due to a sample being taken for chemical analysis.

: Crypt formation /1/ for 4-8 is just commencing.

VIEW: a) O.; b) L., symphysis; c) B., right corpus.

LOCATION OF ORIGINAL:

The Museum, Wells, Somerset, BA5 2UE, U.K.

Badger Hole 226 30, England

a



b



Badger Hole 226 30, England



SITE: Mother Grundy's Parlour, Creswell Crags, England.

SPECIMEN: Eu. 1.7.1.

PROVENANCE: Upper Pleistocene, presumed Late Weichselian (Late Würm),
cf. Upper Paleolithic.

DESCRIPTION: *Homo sapiens sapiens* complete (reconstructed) cranium and
mandible, containing: 7-4(LDM $\bar{1}$)/A8/, 8-4(RDM $\bar{1}$)/A7/,
7-5(LDM $\bar{2}$)/A7/, 8-5(RDM $\bar{2}$)/A6/, 3-1(LI $\bar{1}$)/C4/, 4-1(RI $\bar{1}$)/C4/,
3-2(LI $\bar{2}$)/C3/, 4-2(RI $\bar{2}$)/C3/, 3-3(L \bar{C})/C3/, 4-3(R \bar{C})/C3/,
3-4(LP $\bar{3}$)/C2/, 4-4(RP $\bar{3}$)/C2/, 3-5(LP $\bar{4}$)/1/, 4-5(RP $\bar{4}$)/1/,
3-6(LM $\bar{1}$)/C4/, 4-6(RM $\bar{1}$)/C4/, 3-7(LM $\bar{2}$)/1/, 4-7(RM $\bar{2}$)/1/
and
6-4(LDM $\bar{1}$)/A8/, 5-4(RDM $\bar{1}$)/A8/, 6-5(LDM $\bar{2}$)/A7/, 5-5(RDM $\bar{2}$)/A7/,
2-1(LI $\bar{1}$)/C3/, 1-1(RI $\bar{1}$)/C3/, 2-2(LI $\bar{2}$)/C2/, 1-2(RI $\bar{2}$)/C2/,
2-3(L \bar{C})/C3/, 1-3(R \bar{C})/C3/, 2-4(LP $\bar{3}$)/C2/, 1-4(RP $\bar{3}$)/C2/,
2-5(LP $\bar{4}$)/1/, 1-5(RP $\bar{4}$)/1/, 2-6(LM $\bar{1}$)/C4/, 1-6(RM $\bar{1}$)/C4/,
2-7(LM $\bar{2}$)/1/, 1-7(RM $\bar{2}$)/1/.

DENTAL AGE: 3.3 (3.2-3.6), 3.3 (3.2-3.6) years.

COMMENT:

VIEW: a) O.; b) L., symphysis; c) B., 3-3 area; d) B., left premolar area; e) B., 4-3 area; f) B., right premolar area; g) A.; h) L., 2-3 area; i) L., left premolar area; j) B., 2-6; k) L., 1-3 area; l) B., right premolar area; m) B., 1-6.

LOCATION OF ORIGINAL:

Department of Physical Anthropology, University of Cambridge,
Downing Street, Cambridge, CB2 3DZ, U.K.

Mother Grundy's Parlour Eu.1.7.1., England

a



b



Mother Grundy's Parlour Eu.1.7.1., England

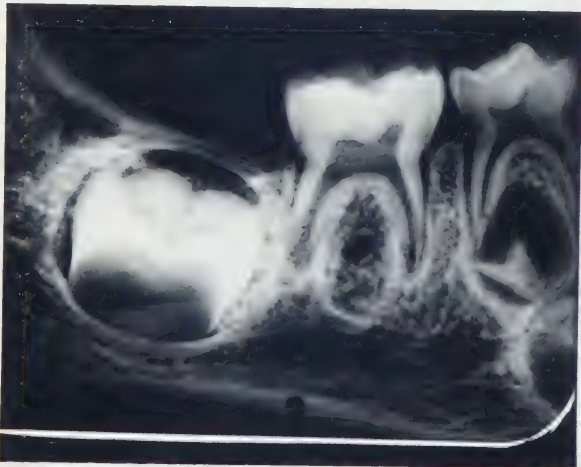
c



d

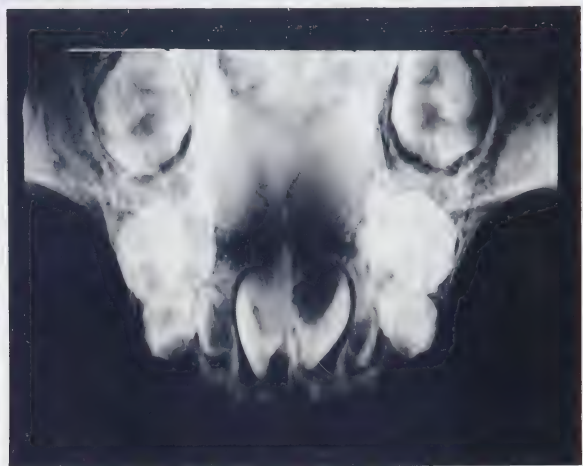


Mother Grunings Parlour Eu.1.7.1., England

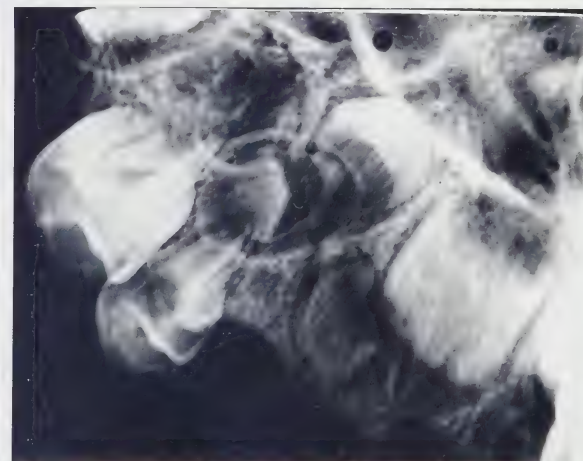


Mother Grundy's Parlour Eu.1.7.1., England

a



b

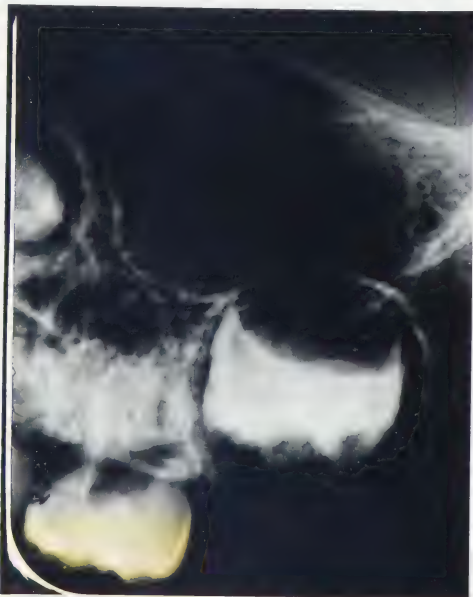


Mother Grundy's Parlour Eu.1.7.1., England

1

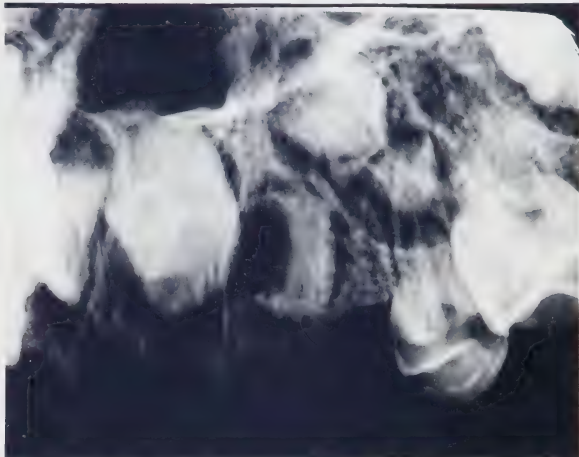


5



Mother Grundy's Parlour Eu.1.7.1., England

k



l



Mother Grundy's Parlour Eu.1.7.1., England



S P A I N

Fig. a-g

SITE: Parpalló, Spain.

SPECIMEN: S.I.P. Cr. 90 + 4 teeth recently excavated by I. Davidson
(30550 + 3 unnumbered).

PROVENANCE: Upper Pleistocene, Würm, Proto-Solutrean and Solutrean
boundary.

DESCRIPTION: *Homo sapiens sapiens* immature mandible and cranium containing:

3-7(LM²)/A7/, 4-7(RM²)/A7/, 3-8(LM³)/C4/, 4-8(RM³)/C4/,

and

1-1(RI¹)/A8/, 2-3(L^C)/A8/, 2-4(LP³)/A8/, 2-5(LP⁴)/A/,
2-6(LM¹)/A8/, 1-6(RM¹)/A8/, 2-7(LM²)/A7/, 1-7(RM²)/A7/,
1-8(RM³)/C4/.

DENTAL AGE: 13.5 (12.9-14.7), 12.8 (11.9-14.8) years.

COMMENT: 1-1, 2-3, 2-4, and 2-5, which were identified as such on the
basis of morphology, non-duplication and attrition, and
attributed to the skull ^{Skinner} ~~by me~~, were recently excavated from
this site (I. Davidson, 1975, pers. comm.).

VIEW: a) B., left molar area; b) B., right molar area;
c) L., left molar area; d) B., right molar area;
e) M-D of 2-4; f) loose teeth - from left to right:
2-3, 1-1 (fragmented), and 2-5 (fragmented); g) O.,
mandible.

LOCATION OF ORIGINAL:

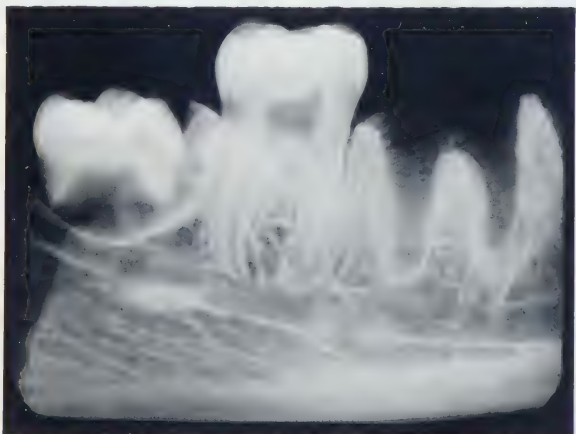
Servicio de Investigacion Prehistorica, Institucion
Alfonso el Magnanimo, Cabelleros 2, Valencia, Spain.

Parpallo, S.I.P. Cr.90, Spain

a

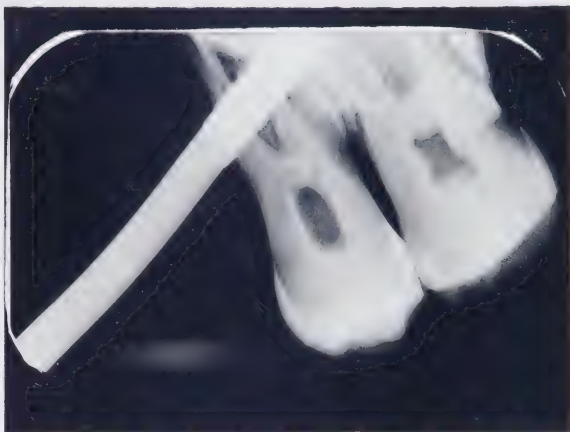


b



Parpallo, S.I.P. Cr.90, Spain

c



d



Parpallo, S.I.P. Cr.90, Spain

e



f



Parpallo, S.I.P. Cr.90, Spain



I T A L Y

Fig. a-h

- SITE: Archi Hill, Reggio Calabria, Italy.
- SPECIMEN: No accession designation.
- PROVENANCE: Upper Pleistocene, Early Würm, Layer C3 of fluvial and deltaic-marine gravels, containing *Paleoloxodon antiquus*, *Dicerorhinus meraki*, *Hippopotamus*, *Bos primigenius*, *Megaceros* sp., *Cervus elaphus* (Ascenzi and Segre, 1971a, 1971b).
- DESCRIPTION: *Homo sapiens neanderthalensis* immature mandible, sans rami, containing: 7-3(LDC)/B7/, 7-4(LDMT)/A8/, 8-4(RDMT)/A8/, 7-5(LDM2)/A8/, 8-5(RDM2)/A8/, 3-1(LIT)/C4/, 4-1(RIT)/C4/, 3-2(LI2)/C3/, 4-2(RI2)/C3/, 3-3(LC)/C3/, 4-3(RC)/C3/, 3-4(LP3)/C2/, 4-4(RP3)/C2/, 3-6(LMT)/C4/, 4-6(RMT)/C4/.
- DENTAL AGE: 3.0 (2.9-3.6), 3.0 (2.7-3.6) years.
- COMMENT: Note the earliest stage of crypt formation /1/ for 3-5 and 4-5 just apical to root bifurcation of the deciduous precursors.
- : Duplicate ^{x-ray exposures} ~~views~~ were required in this heavily-mineralized specimen in order to reveal the crowns of both the erupted and unerupted teeth.

: Note the characteristically enlarged pulp cavities of the deciduous molars especially 7-4 and 8-4 and great arch breadth particularly anteriorly.

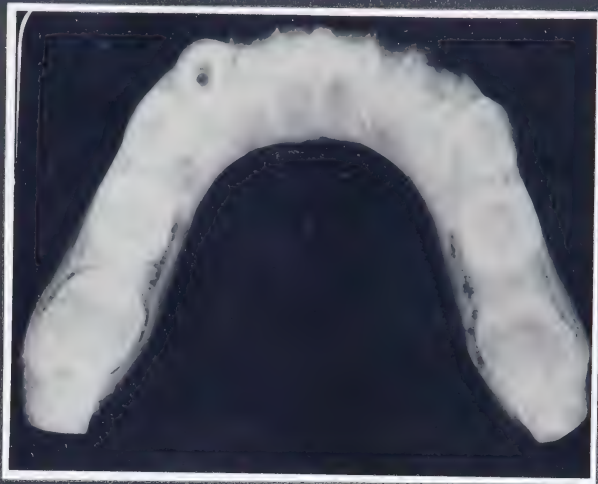
VIEW: a) O.; b) L., symphysis; c) L., left canine area; d) L., left canine area; e) B., left premolar area; f) L., right canine area; g) B., right premolar area; h) B., left molar area.

LOCATION OF ORIGINAL:

Istituto di Anatomia e Istologia Patologica, Università da Roma, Viale Regina Elena, 324 (Policlinico) Rome 00161.

Archi Hill, Italy

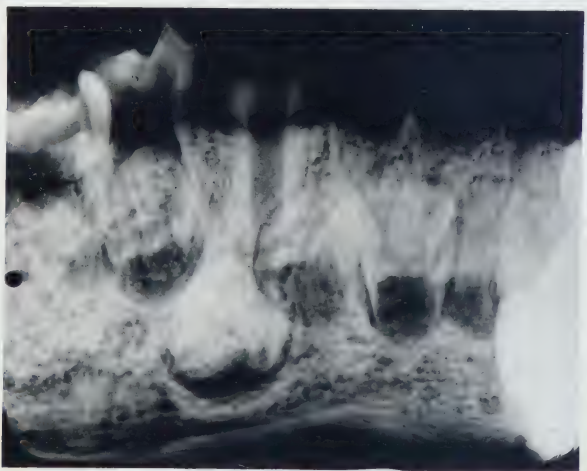
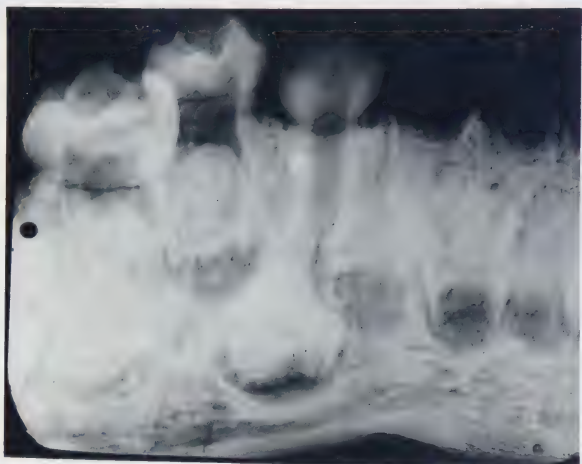
a



b

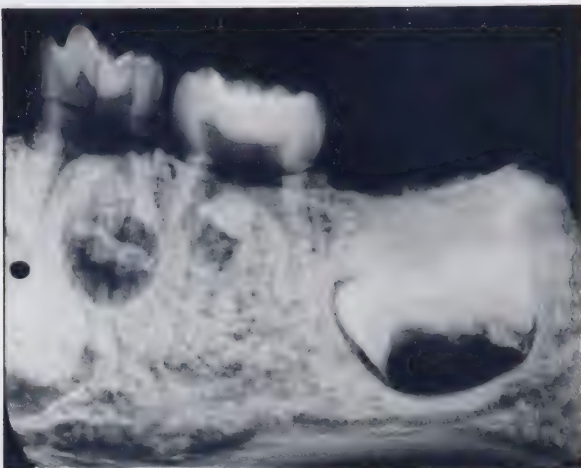


Archi Hill, Italy

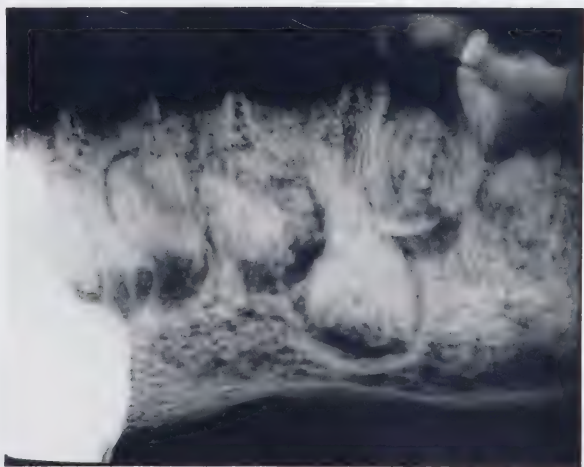


Archi Hill, Italy

e



f



Archi Hill, Italy

g



h



A U S T R I A

Fig. a-e

SITE: Miesslingtal, Austria.

SPECIMEN: 22034 (73577 according to CFH II: 2).

PROVENANCE: Upper Pleistocene, post Würm II, Late Aurignacian.

DESCRIPTION: *Homo sapiens sapiens* immature mandible, sans rami, containing: 7-3(LD \overline{C})/A8/, 8-3(RD \overline{C})/A8/, 7-4(LDM \overline{T})/A8/, 7-5(LDM \overline{Z})/A8/, 8-5(RDM \overline{Z})/A8/, 3-1(LI \overline{T})/A8/ (root only), 4-1(RI \overline{T})/A8/, 3-2(LI \overline{Z})/B7/, 4-2(RI \overline{Z})/B7/, 3-3(L \overline{C})/C5/, 4-3(R \overline{C})/C5/, 3-4(LP $\overline{3}$)/C5/, 4-4(RP $\overline{3}$)/C5/, 3-5(LP $\overline{4}$)/C5/, 4-5(RP $\overline{4}$)/C5/, 3-6(LM \overline{T})/A8/, 4-6(RM \overline{T})/A8/.

DENTAL AGE: 8.2 (8.1-9.6), 7.9 (7.3-8.4) years.

COMMENT: In Szombathy (1950) there is figured a molar crown (root area not visible) which is probably 4-7 from the empty crypt shown in view "f."

: There is no attrition on the erupting (and crowded) lateral incisors and the trace attrition on 4-1 could be due to handling.

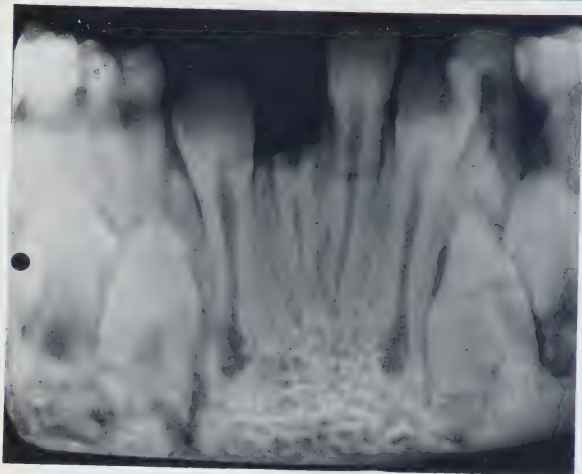
VIEW: a) L., symphysis; b) B., left canine area; c) B., left premolar area; d) B., right canine area; e) B., right premolar area.

LOCATION OF ORIGINAL:

Anthropologisches Abteilung, Naturhistorisches Museum
Wien, A-1014 Wien, Burgring 7, Postfach 417, Austria.

Miesslingtal 22034, Austria

a

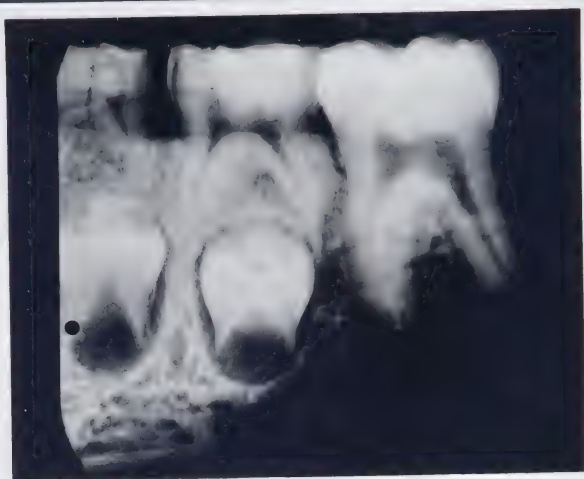


b



Miesslingtal 22034, Austria

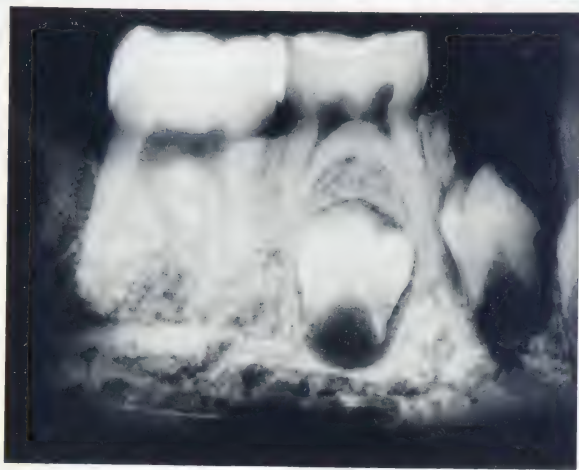
c



d



Miesslingtal 22034, Austria



GERMANY

Fig. a-j

SITE: Ranis, Germany (D.D.R.).

SPECIMEN: 68:8, Ranis 4.

PROVENANCE: Upper Pleistocene, Late Würm, Early Magdalenian.

DESCRIPTION: *Homo sapiens sapiens* immature mandible, containing:
7-3(LD \bar{C})/C4/, 8-3(RD \bar{C})/C4/, 7-4(LDM \bar{I})/B6/, 8-4(RDM \bar{I})/B6/,
7-5(LDM $\bar{2}$)/C4/, 8-5(RDM $\bar{2}$)/C4/, 3-1(LIT)/C2/, 4-1(RIT)/C2/,
3-2(LI $\bar{2}$)/C2/, 4-2(RI $\bar{2}$)/C2/, 3-3(L \bar{C})/C2/, 3-6(LMT)/C3/,
4-6(RMT)/C3/.

DENTAL AGE: 1.1 (0.9-1.7), 1.0 (0.7-1.6) years.

COMMENT: Only in view "a" can one see the early cusp formation for 3-3.
: There is crypt formation (just) for 4-3, 3-7, and 4-7 but
not for 3-4, 4-4, 3-5, and 4-5.

VIEW: a) O.; b) L., symphysis; c) B., left canine area;
d) B., left premolar area; e) B., right canine area;
f) B., right premolar area; g) O.; h) left lateral;
i) frontal; j) right lateral.

LOCATION OF ORIGINAL:

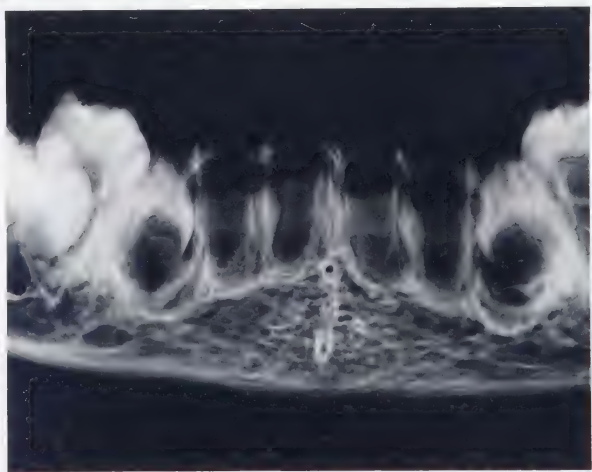
Landesmuseum für Vorgeschichte, Richard-Wagner-Str. 9-10,
Halle (Salle), D.D.R.

Ranis 68:8, Germany(D.D.R.)

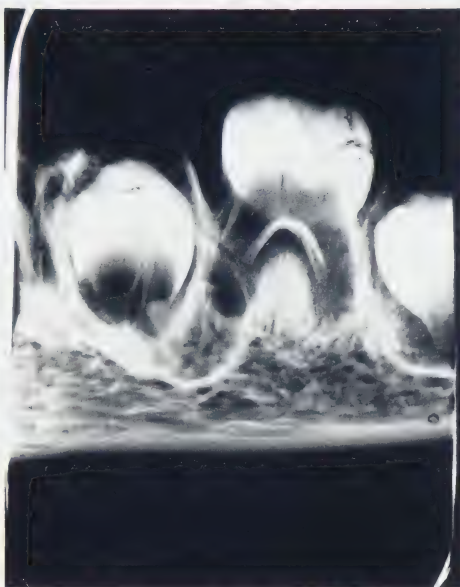
a



b

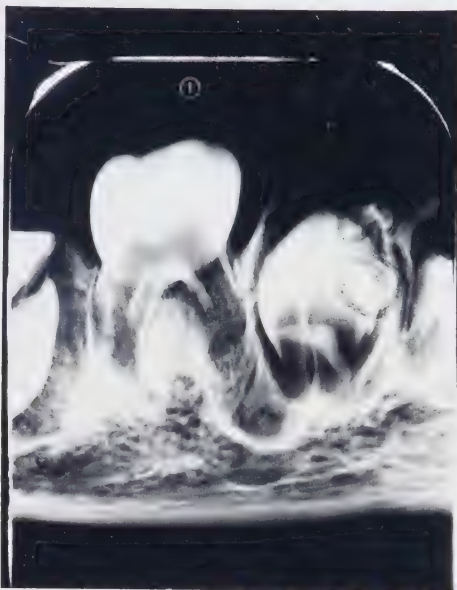


Ranis 68:8, Germany(D.D.R.)

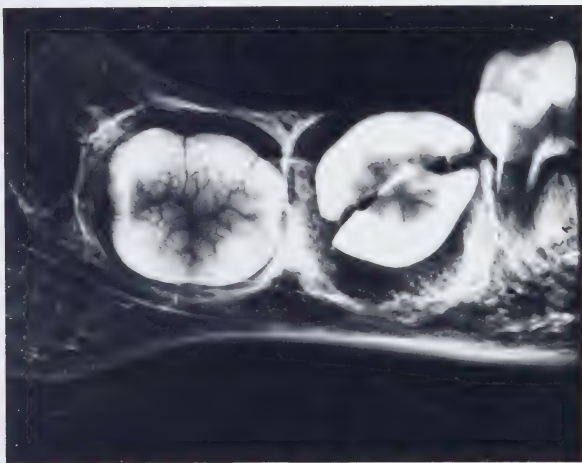


Ranis 68:8, Germany(D.D.R.)

e



f



Ranis 68:8, Germany(D.D.R.)

g



h



Ranis 68:8, Germany(D.D.R.)

i



j



Fig. a-e

SITE: Weimar-Ehringsdorf, Germany (D.D.R.).

SPECIMEN: No accession designation.

PROVENANCE: Upper Pleistocene, Eemian = Last Interglacial, Eastern
Mousterian, 60,000-120,000 B.P., A2-Pa/Th Lower Travertine
(CFH II: 213).

DESCRIPTION: *Homo sapiens neanderthalensis* immature left mandible, and
anterior portion of right, containing: 3-1(LI \bar{T})/A8/,
4-1(RI \bar{T})/A8/, 3-2(LI \bar{Z})/A8/, 4-2(RI \bar{Z})/A8/, 4-3(R \bar{C})/B7/,
4-4(RP $\bar{3}$)/B7/, 3-5(LP $\bar{4}$), 3-6(LMT)/A8/, 3-7(LM $\bar{2}$)/A7/,
3-8(LM $\bar{3}$)/C4/.

DENTAL AGE: 12.6 (12.2-13.0), 11.8 (11.7-12.3) years.

COMMENT: Legoux (1966) considers that the anterior and posterior
fragments of this mandible are from different individuals.
These radiographs show that at least in terms of dental
maturity, the two portions are not incompatible.

: It should be noted that 3-5 occupies an unnaturally low
position due to apical damage and, therefore, its apparent
level of root formation is misleadingly reduced.

: A mild (?incipient) degree of taurodontism is observable.

VIEW:

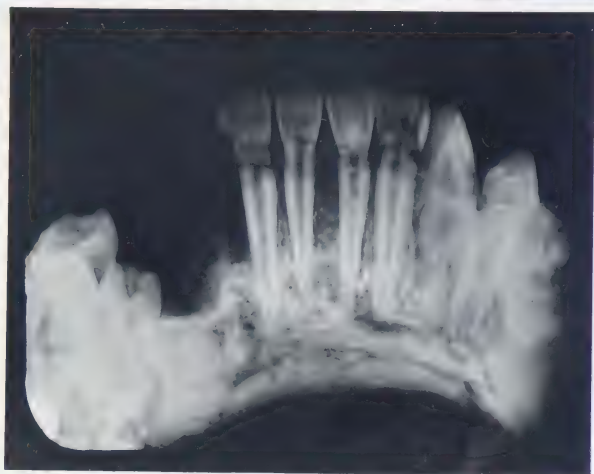
- a) L., symphysis; b) L., left reconstructed area;
- c) L., left molar area; d) B., right canine area;
- e) L., left mandibular corpus.

LOCATION OF ORIGINAL:

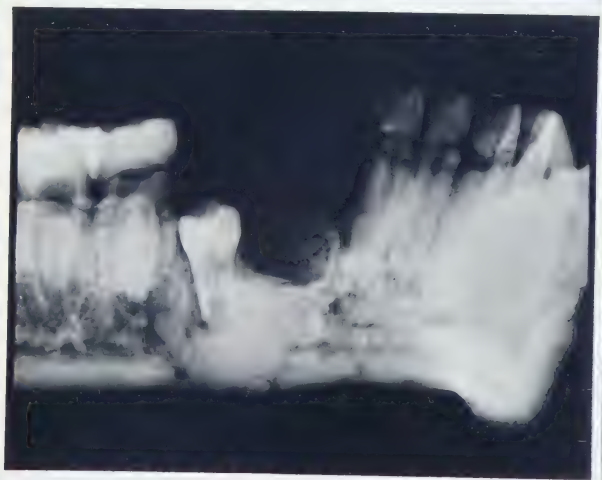
Museum für Ur-Und Frühgeschichte, Thüringens, Schliebfach
59, Weimar, D.D.R.

Weimar-Ehringsdorf, Germany(D.D.R.)

a



b



Weimar-Ehringsdorf, Germany(D.D.R.)

c



d



Weimar-Ehringsdorf, Germany(D.D.R.)



CZECHOSLOVAKIA

Fig. a-b

SITE: Mladeč (Lautsch), (N. Moravia), Czechoslovakia.

SPECIMEN: 5454 (?Mladeč I, CFH II: 53).

PROVENANCE: Upper Pleistocene, Würm I/II Interstadial, Aurignacian.

DESCRIPTION: *Homo sapiens sapiens* immature cranium, containing:
2-4(LP³) (root only)/8/, 2-6(LM¹)/A8/, 1-6(RM¹)/A8/,
2-7(LM²)/A8/, 1-7(RM²)/A8/.

DENTAL AGE: 15.9 (15.4-19.2), 14.9 (13.5-17.0) years.

COMMENT: The dentally immature status for this individual has been inferred from the slight occlusal attrition and lack of distal contact (interproximal) facets on 2-7 and 1-7 plus the rather poorly preserved and indefinite crypts for 2-8 and 1-8 with the former preserving in its roof a trace of alveolar radicular crest formation for root bifurcation.

: Synostosis of the basal synchondrosis cannot be judged due to adhering matrix.

: A tendency to root fusion can be seen in 2-7 and 1-7.

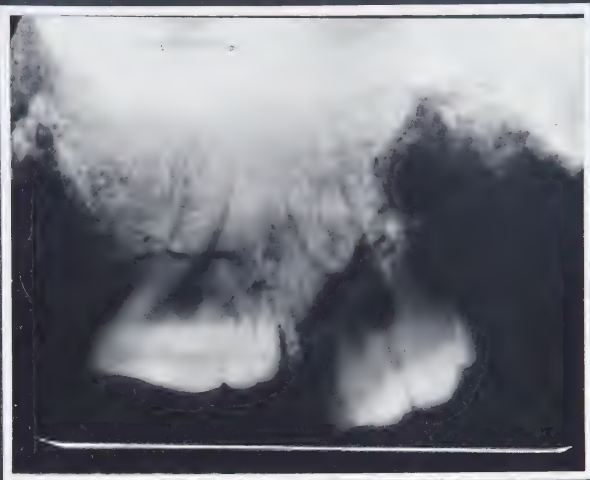
VIEW: a) B., left molar area; b) B., right molar area.

LOCATION OF ORIGINAL:

Anthropologisches Abteilung, Naturhistorisches Museum
Wien, A-1014 Wien, Burgring 7, Postfach 417, Austria.

Mladec 5454, Czechoslovakia

a



b



YUGOSLAVIA

SITE: Krapina, Yugoslavia

SPECIMEN: Krapina D, composed of Fr. 1/22 (frontal), To.2/37.2 (lateral side of left orbit), and Kal. E/6 (left and right parietals, right frontal squamous (CFH II:339).

PROVENANCE: A 12 metre high rock shelter in Hušnjakovo Hill carved into Miocene sandstone by the Krapinica stream during the Upper Riss Glaciation. Infilling, dating from the later part of the Riss-Würm Interglacial to the Early Würm II stadial, has resulted in a deposit 8 metres thick in which are demarcated strata numbered 1 to 9 from below upwards.

: Hominid fossils described here derive from:

a) Cultural strata 3 and 4, containing faunal remains suggestive of closing stages of Riss-Würm and beginning of Würm I stadial, with Early Mousterian bifaces.

b) Cultural stratum 5, containing faunal elements indicating the upper part of the Würm I stadial, with unifacial knives and scrapers showing step-like re-touching. (Malez 1970a, b).

: According to Zupanic (1970) all associated artifacts derive from pebbles, recovered from the nearby Krapinica stream, 75% of which are volcanic tuffs and silicified tuffs and 10% of which are cherts.

PROVENANCE: This largest sample of pre-modern *Homo* fossils is comprised
(Cont'd.) of 75 to 82 individuals aged between 3 and 20 years and
thus according to Wolpoff (1979) is not representative of
an actual biological population. The unusually biased age
profile may partially reflect ritual cannibalism for which
there is some evidence at the site (Smith 1980).

: A ^{14C} date of 30,000 years on fossil bone of unspecified
depth at the site has been reported by Sliepčević (1970).

DESCRIPTION: *Homo sapiens neanderthalensis* calvarium formed from portion
of the frontal and parietals.

DENTAL AGE: There is no associated dentition but according to Smith
(1980) the specimen is adult.

COMMENT: The frontal has been described by Smith (1980) as showing
distinctively male characteristics "of a continual shelf
like torus which emerges rather abruptly above glabella"
(P. 365), as may be seen in view "b".

: This diagnosis is borne out by the extensive pneumatiz-
ation of the frontal sinus (view "a").

: The cultural stratum from which this particular specimen
derives has not been determined.

VIEW: a) Anterior view of frontal; b) right lateral.

LOCATION OF ORIGINAL: Negative radiophotographs of all these Krapina specimens very kindly provided by Prof. Juraj Kallay, M.D., Ph.D.. Originals at Geološko-Paleontološki Muzej, Dematrova Ulica 1, 41000 Zagreb, Yugoslavia.

Krapina, Frontal D, Yugoslavia

a



b



Fig.

SITE: Krapina, Yugoslavia.

SPECIMEN: Krapina Mandible E, Catalogue Number 55.

PROVENANCE: Cultural stratum 5 (Wolpoff 1979), *vide supra*

DESCRIPTION: *Homo sapiens neanderthalensis* immature fragmentary
left mandible, containing:
4-1(RI $\bar{1}$)/A/, 3-1(LI $\bar{1}$)/A/, 3-2(LI $\bar{2}$)/A/, 3-3(L \bar{C})/A/,
3-4(LP $\bar{3}$)/A/, 3-5(LP $\bar{4}$)/A8/, 3-6(LM $\bar{1}$)/A8/, 3-7(LM $\bar{2}$)/A8/.

DENTAL AGE: 16.0 (14.4-18.9), 15.5 (13.9-17.1) years.

COMMENT: Age is based on a 3-8 (Wolpoff # 106) described as
unerupted and with crypt remodelling indicating that
"root formation was partially completed" (Wolpoff
1979: 78). (Not shown in radiograph.)

VIEW: B. of 3-5, 3-6, 3-7.

LOCATION OF ORIGINAL:

Geološko-Paleontološki Muzej, Dematrova Ulica 1,
41000 Zagreb, Yugoslavia.

Trapina, Mandible E, Yugoslavia

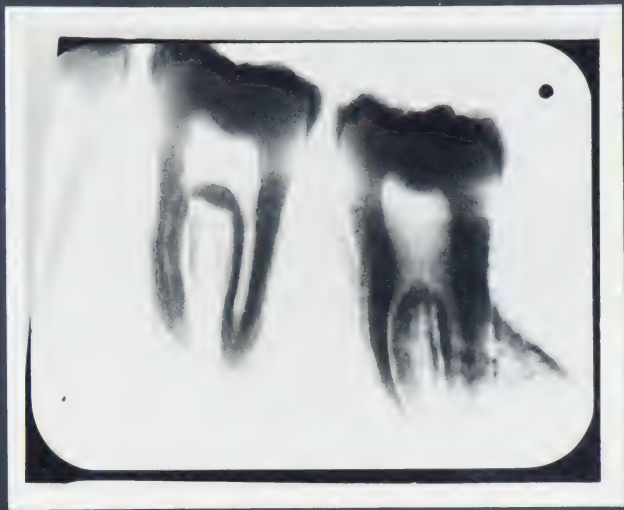


Fig. a-c

SITE: Krapina, Yugoslavia

SPECIMEN: Krapina Maxilla D, Catalogue Number 48, and Mandible D, Catalogue Number 54.

PROVENANCE: Cultural Stratum 4 (Wolpoff 1979), *vide supra*.

DESCRIPTION: *Homo sapiens neanderthalensis* immature fragmentary upper and lower left jaws associated by Wolpoff (1979), containing:
(Maxilla) 2-4(LP3)/A8/, 2-5(LP4)/A8/, 2-6(LM1)/A8/, 2-7(LM2)/A8/
and
(Mandible) 3-2(LI2)/A/, 3-3(LC̄)/A8/, 3-4(LP3)/A8/, 3-5(LP4)/A8/, 3-6(LM̄)/A8/.

DENTAL AGE: 17.7 (15.4-19.3), 17.2 (14.6-20.9) years.

COMMENT: Age is based on the "not fully erupted" status of a 1-8 (Wolpoff # 163) associated by Wolpoff (1979: 81) with these jaws.

: View "b" shows a degree of rotation of 3-4 in a buccal direction according to Kallay (1963).

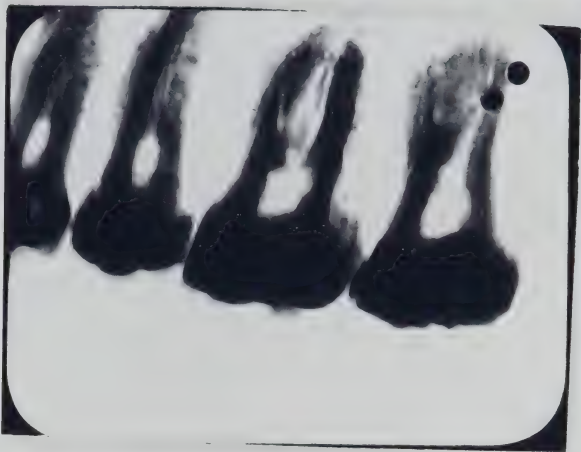
VIEW: a) B. of left maxilla; b) B. of left mandible;
 c) B. of left mandible.

LOCATION OF ORIGINAL:

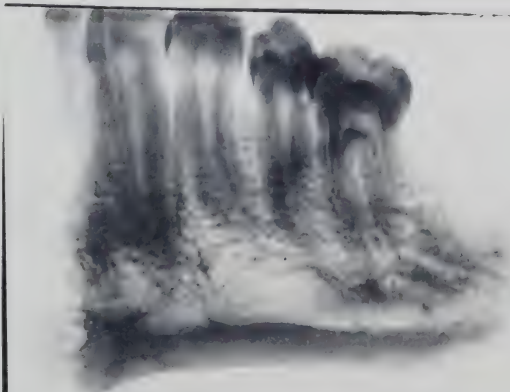
Geološko-Paleontološki Muzej, Dematrova Ulica 1,
41000 Zagreb, Yugoslavia.

Krapina, Maxilla D, Mandible D, Yugoslavia

a



b



Krapina, Maxilla D, Mandible D, Yugoslavia



Fig. a-c

- SITE: Krapina, Yugoslavia.
- SPECIMEN: Krapina Mandible H, (Catalogue Number 58).
- PROVENANCE: Cultural Stratum 3 (Wolpoff 1979), *vide supra*.
- DESCRIPTION: *Homo sapiens neanderthalensis* mature mandible sans
 rami, containing a complete dentition.
- DENTAL AGE: Dentally adult.
- COMMENT: In view "a" the two incisors on the right side of the
 radiophotograph are felt to be 3-1, 3-2, based on their
 flat pulp chamber roofs (contra antimeres) which would
 correlate with the stronger incisal attrition on the
 left side (see Fig. 1, Wolpoff 1979).
- : Views "b" and "c" show the typically increasing degree
 of taurodontism of progressively posterior molars at
 Krapina, from supraradicular endotaurodontism for 3-6,
 4-6 to radicular endotaurodontism for 4-7, 3-7 to
 total endotaurodontism for 3-8 (terminology after
 Kallay (1970a).
- : Wolpoff (1979) suggests this mandible may be male, a
 conjecture strengthened by the relative size of the

canine root (view "c").

VIEW:

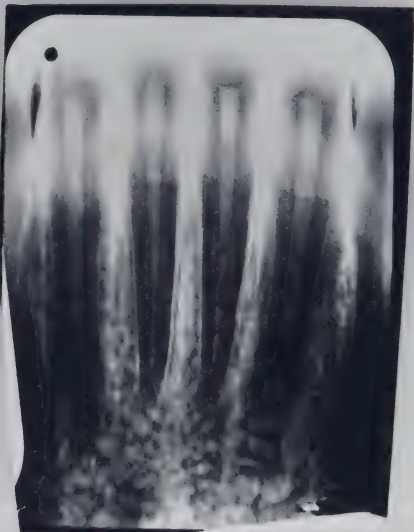
- a) B. of incisors; b) B. of left cheek teeth;
- c) B. of 4-3 to 4-7.

LOCATION OF ORIGINAL:

Geološko-Paleontološki Muzej, Dematrova Ulica 1,
41000 Zagreb, Yugoslavia.

Krapina, Mandible H, Yugoslavia

a



b



Krapina, Mandible II, Yugoslavia

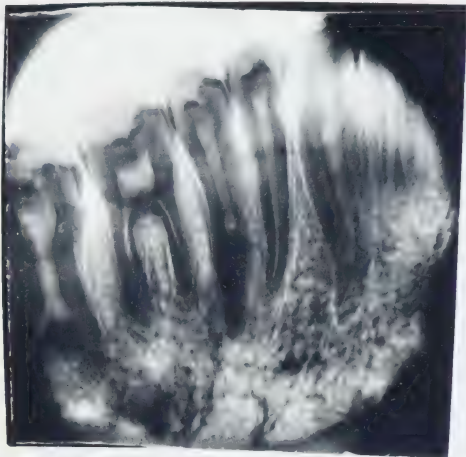


Fig. a-d

SITE: Krapina, Yugoslavia.

SPECIMEN: Krapina Mandible J, Catalogue Number 59.

PROVENANCE: Cultural stratum 4 (Wolpoff 1979), *vide supra*.

DESCRIPTION: *Homo sapiens neanderthalensis* mature mandible, containing a complete dentition except for 3-8 (LM $\bar{3}$), 3-4 (LP $\bar{3}$) and 4-4(RP $\bar{3}$).

DENTAL AGE: Dentally adult.

COMMENT: View "b" is a close up of the left premolar region showing at the arrowed apex of the root of 3-5 what Kallay (1970b) describes as an "embolus".

: Both 3-4 and 4-4 were lost premortem with subsequent infilling of the socket as can better be seen in view "c".

: Note that only 4-8 appears ~~markedly~~ ^{markedly} taurodont in these molars (view "d").

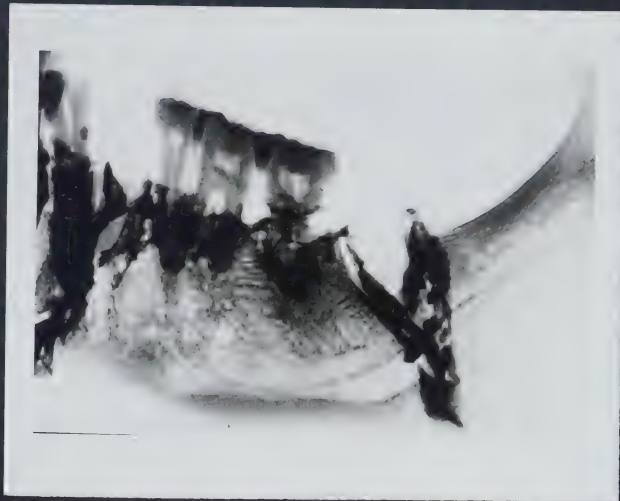
: According to Wolpoff (1979) this individual is likely male.

VIEW: a) B. of left cheek teeth; b) B. of 3-4 region, 3-5, 3-6; c) B. of 4-4 region; d) B. of right cheek teeth.

LOCATION OF ORIGINAL: Geološko-Paleontološki Muzej, Dematrova Ulica
1, 41000 Zagreb, Yugoslavia.

Krapina, Mandible J, Yugoslavia

a



b



Krapina, Mandible J, Yugoslavia

c



d

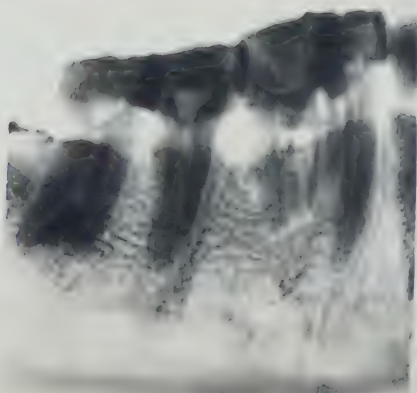


Fig.

SITE: Krapina, Yugoslavia.

SPECIMEN: Krapina Mandible (Ramus) K, Catalogue Number 63.

PROVENANCE: Cultural Stratum 5 (Wolpoff 1979), *vide supra*.

DESCRIPTION: *Homo sapiens neanderthalensis* mature right ascending ramus, containing 4-8 (RM3).

DENTAL AGE: Dentally adult.

COMMENT: Faintly observable at the superior end of the mandibular canal is the "Horizontal-Oval" form of opening for the mandibular foramen. This trait observed in much higher frequencies in neanderthals than in more recent populations has been deemed by Smith (1978) to be a genetically controlled trait with no demonstrable functional significance for the action of the sphenomandibular ligament which attaches in this area.

VIEW: L.

LOCATION OF ORIGINAL: Geološko-Paleontološki Muzej, Dematrova Ulica 1,
41000 Zagreb, Yugoslavia

Krapina, Ramus K, Yugoslavia



Fig.

- SITE: Krapina, Yugoslavia.
- SPECIMEN: (Left) Two forming lateral incisors.
(Right) Krapina Maxilla C, Catalogue Number 47.
- PROVENANCE: (Maxilla) Cultural stratum 5 (Wolpoff 1979), *vide supra*.
- DESCRIPTION: *Homo sapiens neanderthalensis* immature fragmentary maxilla, containing:
6-5(LDM₂)/A8/, 2-1(LI₁)/A6/, 1-1(RI₁)/A6/, 2-2(LI₂)/B6/,
1-2(RI₂)/A6/, 2-5(LP₄)/C4/, 2-6(LM₁)/A8/, 2-7(LM₂)/B6/.
- DENTAL AGE: 9.7 (9.5-9.9), 9.2 (9.1-9.8) years.
- COMMENT: Both the unassociated lateral incisors and the central incisors of the maxilla exhibit forming roots. That on the left shows the lateral diminution and developing sinusoidal shape of the pulp chamber walls as the root matures.
- VIEW: (Left) M.-D.; (Right) L. of incisors.
- LOCATION OF ORIGINAL:
Geološko-Paleontološki Muzej, Dematrova Ulica 1,
41000 Zagreb, Yugoslavia.

Krapina, Maxilla C, Yugoslavia

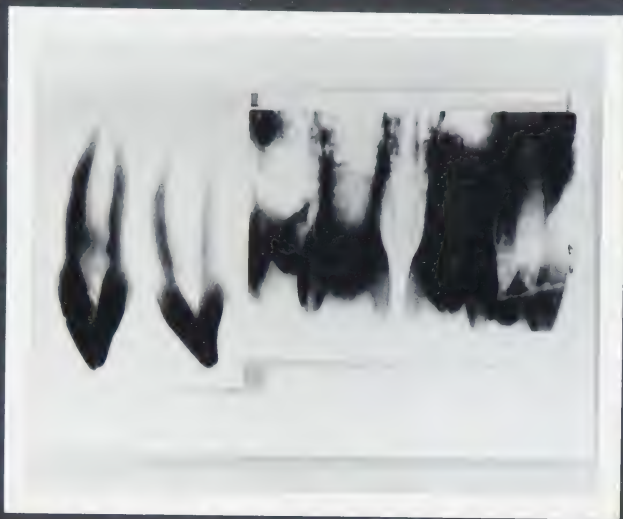


Fig. a-b

SITE: Krapina, Yugoslavia.

SPECIMEN: Isolated maxillary permanent first incisors.

PROVENANCE: According to Wolpoff (1979) the majority of isolated teeth at Krapina likely come from cultural stratum 4, *vide supra*.

DESCRIPTION: *Homo sapiens neanderthalensis*.

DENTAL AGE: All show completed roots.

COMMENT: Both views are of the same five teeth.

 : Note the strong interproximal wear facets (view "a") and lingual bulge of the cingulum (view "b").

 : The alternating expansion and dilation of the pulp chamber outline in mesio-distal view ("b") in the cervical region is of interest.

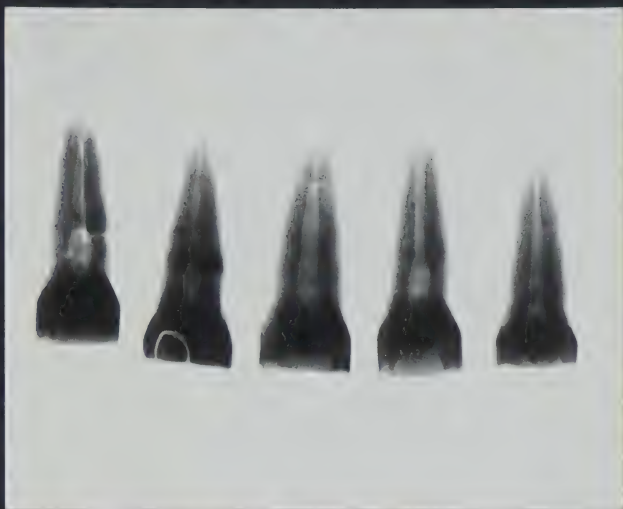
VIEW: a) B.; b) M.-D.

LOCATION OF ORIGINAL:

 Geološko-Paleontološki Muzej, Dematrova Ulica 1,
 41000 Zagreb, Yugoslavia.

Krapina, Maxillary First Incisors,
Yugoslavia

a



b

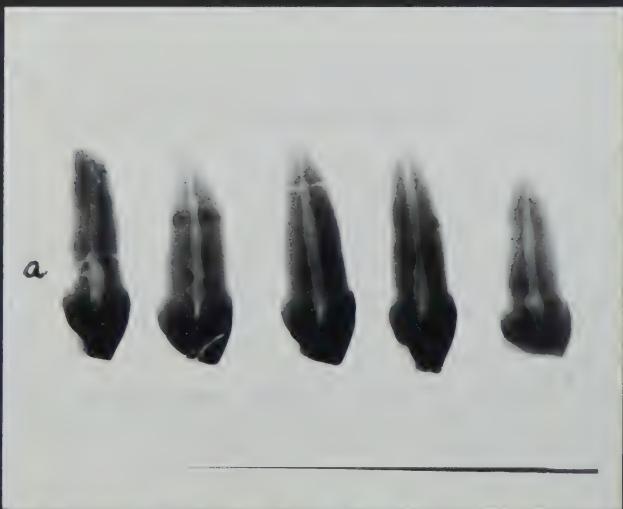


Fig. a-f

SITE: Krapina, Yugoslavia.

SPECIMEN: Isolated maxillary permanent lateral incisors.

PROVENANCE: *Vide supra.*

DESCRIPTION: *Homo sapiens neanderthalensis.*

DENTAL AGE: Most, but not all, show completed roots.

COMMENT: In that 39 isolated teeth are illustrated here, while Wolpoff (1979) records the presence of only 15 isolated upper lateral incisors from Krapina, there is the possibility that some of these radiophotographs have been incorrectly labelled and are in reality first incisors.

: Nevertheless, the pronounced size of the Krapina maxillary incisors, due in part to a marked development of the lingual basal tubercle, is well illustrated here.

: The cervical contraction of the pulp chamber outline in these teeth would appear to develop at or shortly after root completion but diminish or disappear with increasing age of the tooth as indicated by incisal attrition.

VIEW: a-f) M.-D.

LOCATION OF ORIGINAL:

Geološko-Paleontološki Muzej, Dematrova Ulica 1,
41000 Zagreb, Yugoslavia.

Krapina, Maxillary Second Incisors,
Yugoslavia

a



b

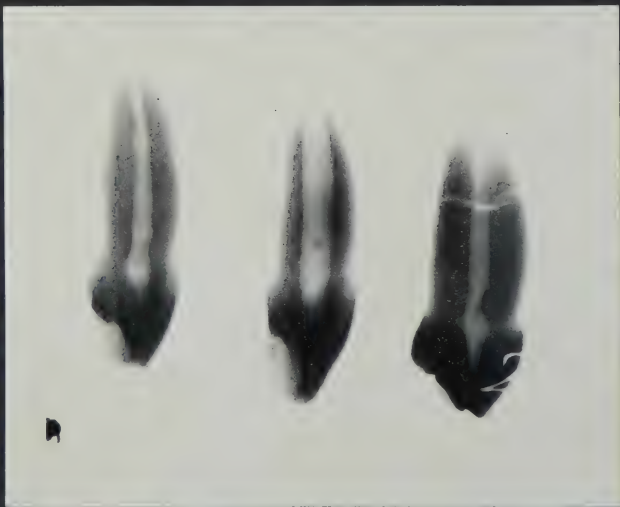


Krapina, Maxillary Second Incisors,
Yugoslavia

c

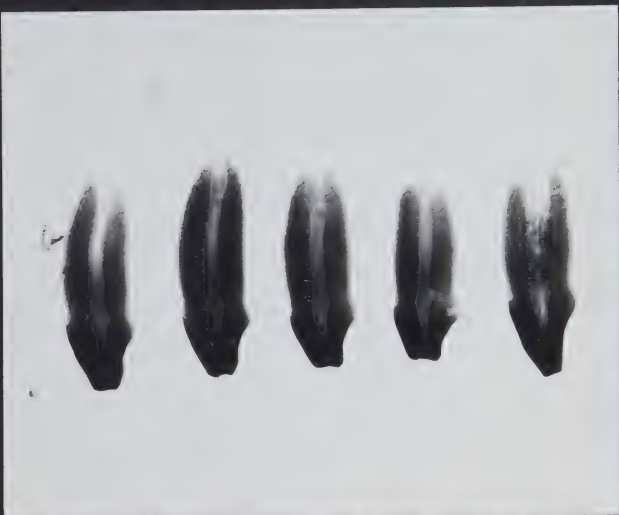


d



Krapina, Maxillary Second Incisors,
Yugoslavia

e



f



Fig. a-e

SITE: Krapina, Yugoslavia.

SPECIMEN: Isolated maxillary permanent canines.

PROVENANCE: *Vide supra.*

DESCRIPTION: *Homo sapiens neanderthalensis.*

DENTAL AGE: All show completed roots.

COMMENT: Again there is a discrepancy in the number of isolated maxillary canines illustrated here (17) and the 15 listed by Wolpoff (1979).

 : While sharing a similar pulp outline to the maxillary incisors, that of the maxillary canines seems in some cases (view "b") much more irregular.

 : Kallay (1963) describes the two canines shown on the left of view "e" as "premolarized".

VIEW: a-e) M.-D.

LOCATION OF ORIGINAL:

 Geološko-Paleontološki Muzej, Dematrova Ulica 1,
 41000 Zagreb, Yugoslavia.

Krapina, Maxillary Canines, Yugoslavia

a

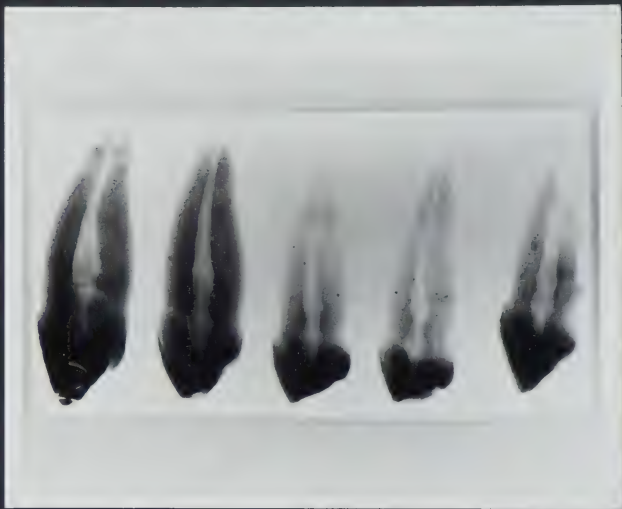


b



Krapina, Maxillary Canines, Yugoslavia

c



d



Krapina, Maxillary Canines, Yugoslavia



Fig. a-e

- SITE: Krapina, Yugoslavia.
- SPECIMEN: Isolated maxillary permanent premolars.
- PROVENANCE: *Vide supra.*
- DESCRIPTION: *Homo sapiens neanderthalensis.*
- DENTAL AGE: All appear to have completed roots.
- COMMENT: Views "a - d" illustrate 26 teeth while Wolpoff (1979) lists only 22 isolated maxillary premolars. Presumably the four shown in view "d" are duplicated in the other views.
- : Most Krapina maxillary premolars are double rooted although some show an interradicular crest with two apical canals.
- : Varying degrees of supraradicular endotaurodontism are evident.
- : The peculiar external contour of the premolar crowns shown in view "c" is due to enamel hypoplasia (Kallay 1963).
- : The four teeth shown in view "d" exhibit "dentinal spurs" according to Kallay (1963). By this he appears

COMMENT: to mean the dentinal evaginations on the sides of the
(Cont'd.) pulp chamber in the cervical region as has been
observed on the anterior maxillary teeth.

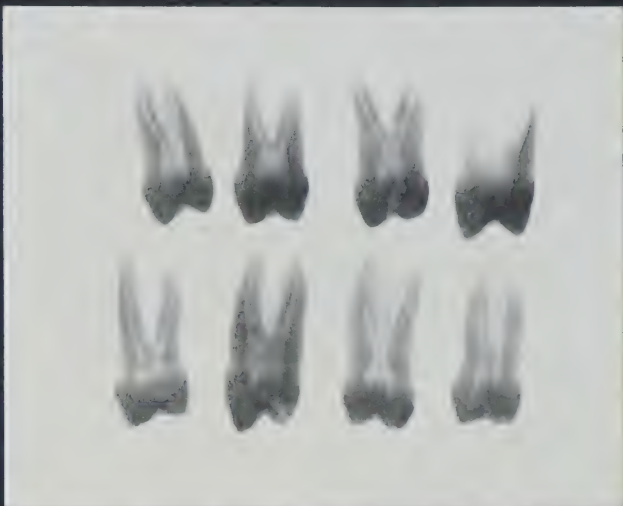
VIEW: a-d) M.-D.

LOCATION OF ORIGINAL:

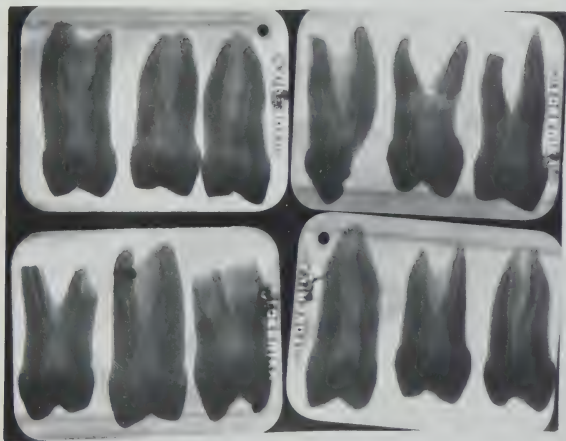
Geološko-Paleontološki Muzej, Dematrova Ulica 1,
41000 Zagreb, Yugoslavia.

Krapina, Maxillary Premolars, Yugoslavia

a

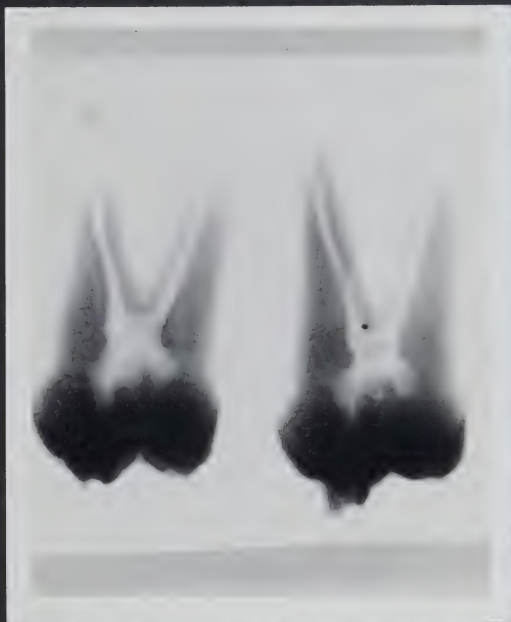


b



Krapina, Maxillary Premolars, Yugoslavia

c



d



Krapina, Maxillary Premolars, Yugoslavia



Fig. a-c

SITE: Krapina, Yugoslavia.

SPECIMEN: Isolated maxillary permanent molars.

PROVENANCE: *Vide supra.*

DESCRIPTION: *Homo sapiens neanderthalensis.*

DENTAL AGE: Most, but not all, show completed roots.

COMMENT: Both views "a and b" show the same teeth but from different sides.

: View "c", although regrettably fuzzy, has been included to show the extreme degree of taurodontism exhibited by some of the Krapina maxillary molars.

VIEW: a) B.-L.; b) M.-D.; c) M.-D.

LOCATION OF ORIGINAL:

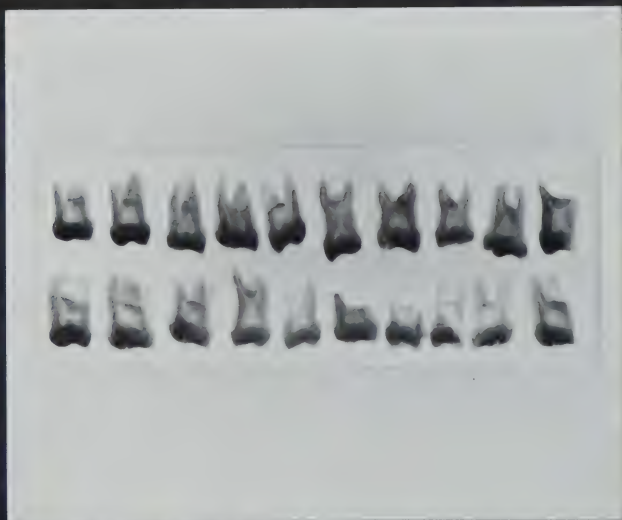
Geološko-Paleontološki Muzej, Dematrova Ulica 1,
41000 Zagreb, Yugoslavia.

Krapina, Maxillary Molars, Yugoslavia

a



b



Krapina, Maxillary Molars, Yugoslavia



Fig. a-b

SITE: Krapina, Yugoslavia.

SPECIMEN: Isolated mandibular permanent incisors.

PROVENANCE: *Vide supra.*

DESCRIPTION: *Homo sapiens neanderthalensis.*

DENTAL AGE: All teeth have completed roots.

COMMENT: Those incisors illustrated in view "a" have more tapering roots and apical canals than those in view "b" suggesting the former are likely to be central incisors.

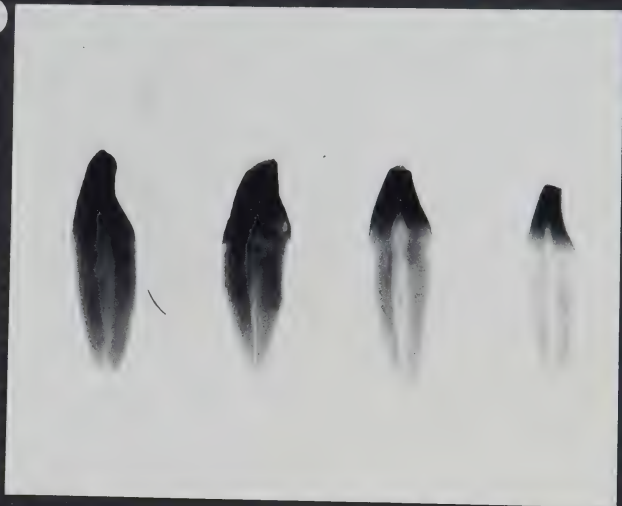
: On several of the teeth the pulp chamber and apical canal are voluminous despite associated strong incisal attrition, suggesting a highly abrasive substance contributing to incisal edge reduction at a rate faster than the normal diminution of the pulp chamber with age. These observations may point to a task-related rather than diet-related mechanism for incisal attrition.

LOCATION OF ORIGINAL:

Geološko-Paleontološki Muzej, Dematrova Ulica 1,
41000 Zagreb, Yugoslavia.

Krapina, Mandibular Incisors, Yugoslavia

a



b

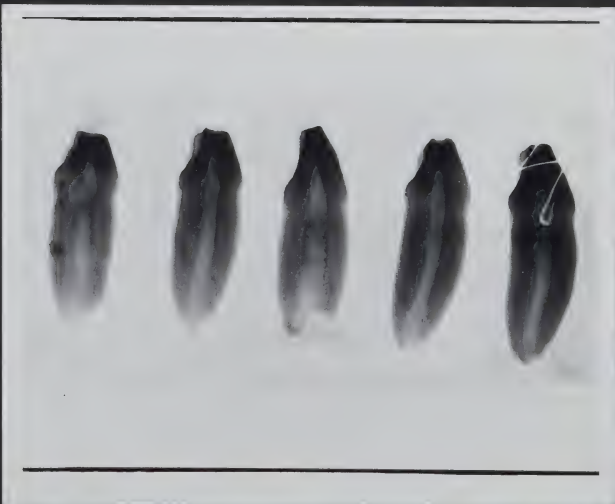


Fig.

SITE: Krapina, Yugoslavia.

SPECIMEN: Isolated mandibular permanent canines.

PROVENANCE: *Vide supra.*

DESCRIPTION: *Homo sapiens neanderthalensis.*

DENTAL AGE: Roots are complete.

COMMENT: Note that like the other anterior teeth from both jaws
the pulp outline in the cervical region shows
characteristic dentine spurs.

VIEW: M.-D.

LOCATION OF ORIGINAL:
Geološko-Paleontološki Muzej, Dematrova Ulica 1,
41000 Zagreb, Yugoslavia.

Krapina, Mandibular Canines, Yugoslavia



Fig. a-d

SITE: Krapina, Yugoslavia.

SPECIMEN: Isolated mandibular permanent premolars.

PROVENANCE: *Vide supra.*

DESCRIPTION: *Homo sapiens neanderthalensis.*

DENTAL AGE: Most, but not all, of the roots are completed.

COMMENT: Comparing the apical canals in views "a" and "b", particularly the four on the left of view "b", a progressive diminution of the pulp canal can be seen to correspond with increasing occlusal attrition, and hence age. Interestingly, secondary dentine formation appears to show an apical-occlusal gradient.

 : View "c" shows a 3-4 (LP $\bar{3}$) in mesio-distal view with a double root (Kallay 1963).

 : Those teeth in view "d" are all fourth premolars.

VIEW: a - d) M.-D.

LOCATION OF ORIGINAL:

 Geolosko-Paleontoloski Muzej, Dematrova Ulica 1,
 41000 Zagreb, Yugoslavia.

Krapina, Mandibular Premolars, Yugoslavia

a



b



Krapina, Mandibular Premolars, Yugoslavia

c



d



Fig. a-c

SITE: Krapina, Yugoslavia.

SPECIMEN: Isolated mandibular permanent molars.

PROVENANCE: *Vide supra.*

DESCRIPTION: *Homo sapiens neanderthalensis.*

DENTAL AGE: Many of the molars illustrated still show open apical canals and little or no occlusal attrition.

COMMENT: Views "a" and "b" are of the same teeth.

: Judging from the pattern of increasing taurodontism in progressively distal molars, observed earlier (for example, Mandible H), the molars shown in views "a" and "b" are more likely to be firsts while those in view "c" with radicular or total endotraodontism are second and third molars.

: Jaspers and Witkop (1980) provide an excellent review of the evidence for likely etiologies for taurodontism. Some of their important observations are that this trait occurs normally in about 2.5% of adult Caucasians; that while karyotypically normal individuals may show the trait, 11 of 12 patients with X-Chromosomal

COMMENT:
(Cont'd.)

aneuploidy (extra X-chromosomes) were taurodontic usually to a severe degree. Since taurodontic deciduous and permanent molars have been observed in neanderthals from Belgium to Italy to Yugoslavia, it seems likely that we are not dealing with a prehistoric pandemic of aneuploidy. However, the genetic link to the x-chromosome is interesting since according to the Lyon hypothesis, only one x-chromosome in each somatic cell is active under conditions of late or only partial inactivation of the normally quiescent x chromosome; i.e. "In the case of surplus sex chromosome conditions, [if] cell proliferation rates are slower, it seems feasible that the invagination of the epithelial diaphragm would be delayed" (Jaspers and Witkop 1980: 410).

VIEW: a) B-L.; b) M-D.; c) M-D.

LOCATION OF ORIGINAL:

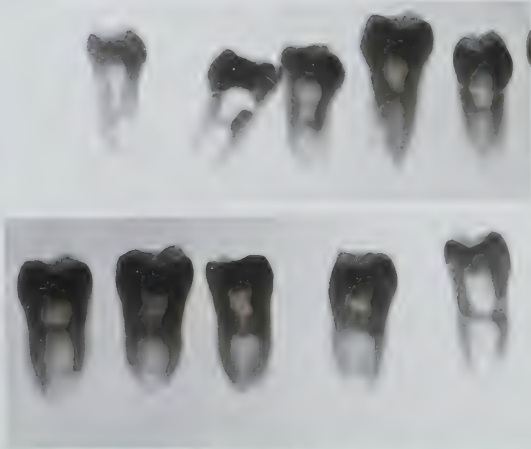
Geološko-Paleontološki Muzej, Dematrova Ulica 1,
41000 Zagreb, Yugoslavia.

Krapina, Mandibular Molars, Yugoslavia

a



b



Krapina, Mandibular Molars, Yugoslavia



Fig.

SITE: Krapina, Yugoslavia.

SPECIMEN: Isolated forming permanent molars.

PROVENANCE: *Vide supra.*

DESCRIPTION: *Homo sapiens neanderthalensis.*

DENTAL AGE: All show incomplete root formation.

COMMENT: The three teeth on the left are lowers and that on
the right an upper.

VIEW: ?

LOCATION OF ORIGINAL:

Geološko-Paleontološki Muzej, Dematrova Ulica 1,
41000 Zagreb, Yugoslavia.

Krapina, Forming Molars, Yugoslavia



Fig. a-b

SITE: Krapina, Yugoslavia.

SPECIMEN: Isolated deciduous molars.

PROVENANCE: *Vide supra.*

DESCRIPTION: *Homo sapiens neanderthalensis*.

DENTAL AGE: Tooth formation ranges from root initiation to root complete.

COMMENT: In both views, the identifications of particular teeth are tentative.

```
:      View "a":  (Top Row) - DM2's
```

(Bottom Row) - DM1's

View "b": (Top Row, left) - $DM\bar{2}$

(Top Row, middle) - $DM\bar{T}$

(Top Row, right) - $DM\bar{2}$

(Bottom Row, two left) - DM2

(Bottom Row, two right) - $DM\bar{T}$

: Note in view "b" (Top Row, middle) evidence of root resorption.

VIEW: a-b) M.-D.

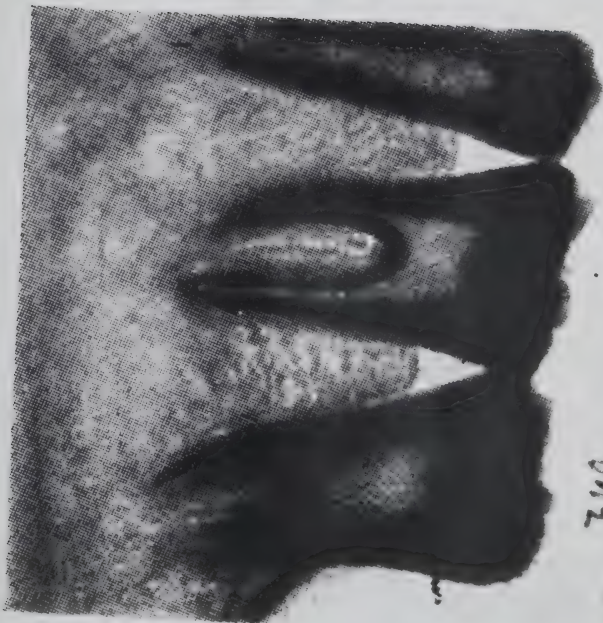
LOCATION OF ORIGINAL:

Geološko-Paleontološki Muzej, Dematrova Ulica 1,
41000 Zagreb, Yugoslavia.

R₂

M₁

M₂



may be the Kropp's E with near-turbulent motion. High root station.
Deep pulp chamber in the median (Holt, D)



Fig. 121.

Copy of the original manuscript of the
first volume of the

History of the State of New York
from its first settlement to the
present time. By John Smith.
New York: 1841. 28. 136 pp. (1841)

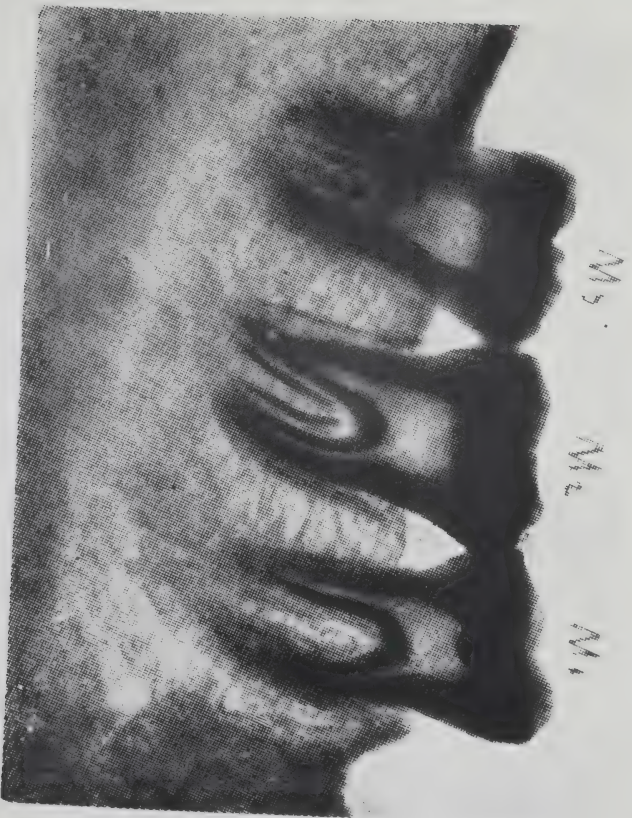


Fig 492

✓ ray of Virginia available to me
high wet steam & deep pulp samples (Hick, 2)

P₂

M₁

M₂







Fig 192

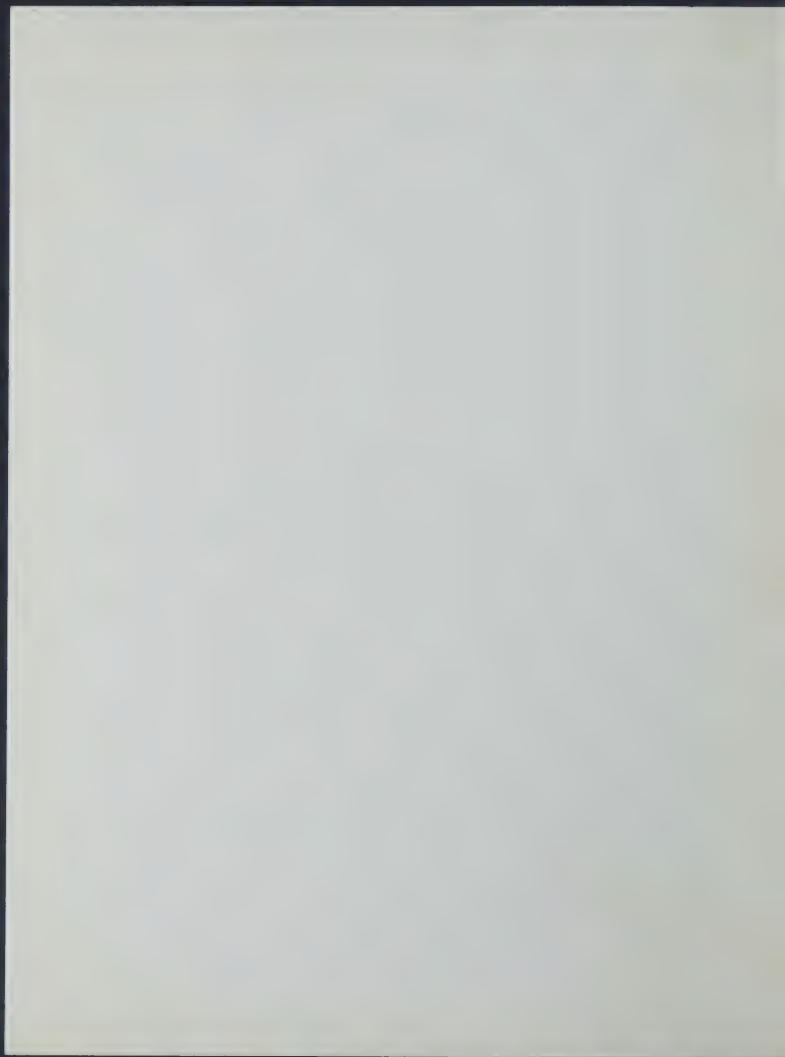
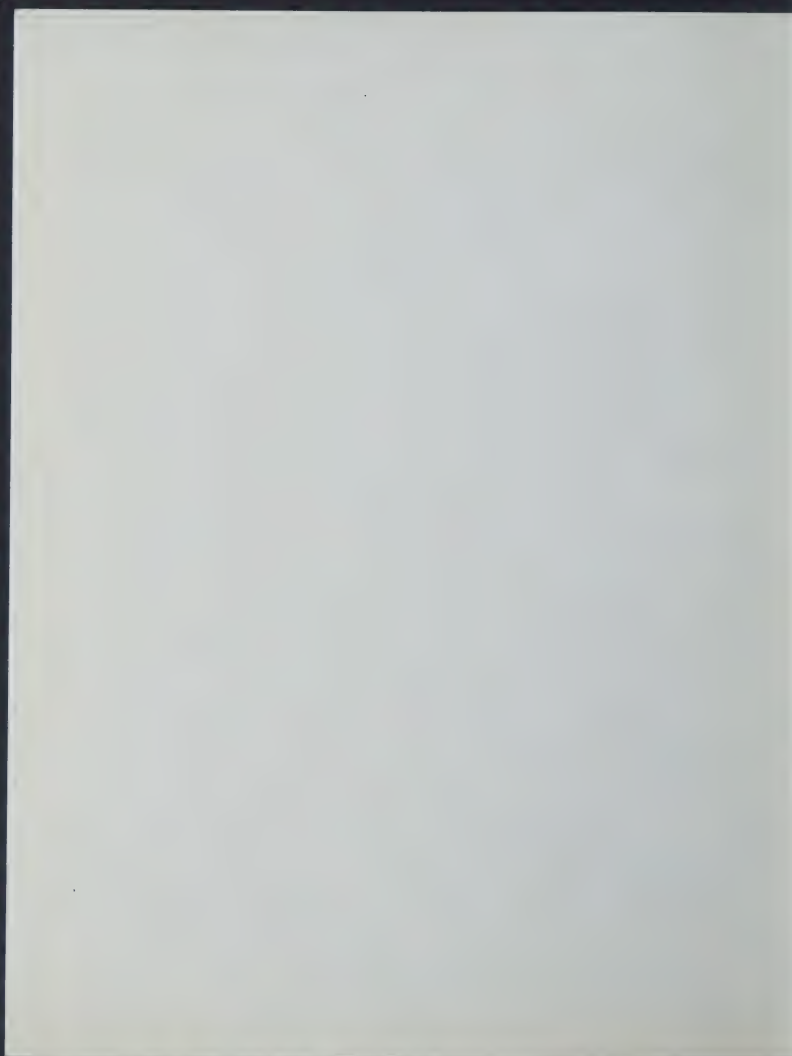




Fig. 121.

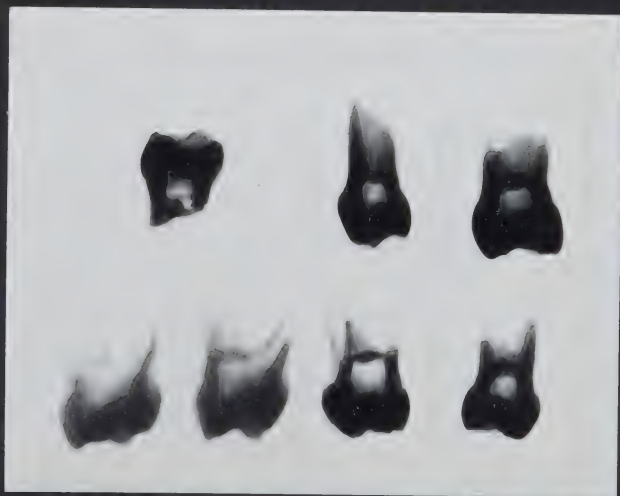


Krapina, Deciduous Molars, Yugoslavia

d



b



I S R A E L

Fig. a-b

SITE: Mugharet es-Skhul, Mount Carmel, Israel.

SPECIMEN: Skhul I.

PROVENANCE: Upper Pleistocene, Gottweiger Interstadial or Würm II
(correlated with Tabun Layer C, ca. 45,000 ± 2,000 B.P.),
Levallois-Mousterian (CFH III: 141).

DESCRIPTION: *Homo sapiens neanderthalensis* ("progressive") immature
calvaria and mandible (reconstructed) sans rami, containing:
7-2(LDI \bar{Z})/A/, 8-3(RDC \bar{C})/A8/, 8-4(RDM \bar{T})/A8, 7-5(LDM \bar{Z})/A8/,
8-5(RDM \bar{Z})/A8/, 4-1(RIT \bar{C})/C4/, 4-2(RI \bar{Z})/C4/, 4-3(RC \bar{C})/C3/,
4-4(RP $\bar{3}$)/C2/, 3-5(LP $\bar{4}$)/1/, 4-5(RP $\bar{4}$)/1/, 3-6(LMT \bar{C})/C4/,
4-6(RMT \bar{C})/C4/, 3-7(LM \bar{Z})/1/.

DENTAL AGE: 3.5 (3.2-3.6), 3.4 (3.2-3.6) years.

COMMENT: Formation scores for the anterior teeth are based on
observations in McKown and Keith (1939).

: Note the lack of enlarged pulp cavities.

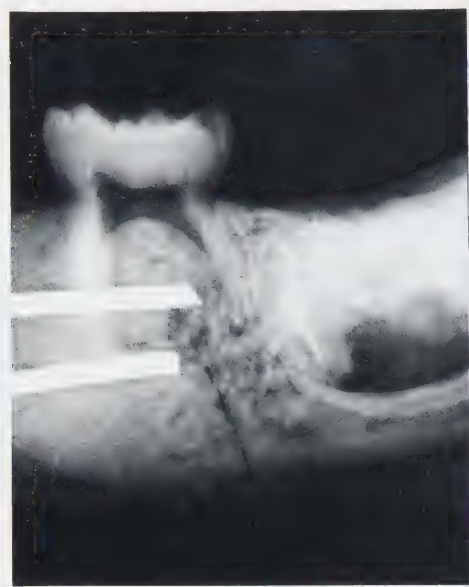
VIEW: a) B., left premolar area; b) B., right premolar area.

LOCATION OF ORIGINAL:

Radiographs supplied by P. Smith, Laboratory of Physical
Anthropology, Department of Anatomy and Embryology, Hebrew
University Hadassah Schools of Medicine and Dental Medicine,
Hadassah P.O.B. 1172, Jerusalem, Israel.

Mugharet es-Skhul I, Israel

a



b



I N D O N E S I A

Fig.

SITE: Trinil, East Java, Indonesia.

SPECIMEN: Trinil 3, Femur I, D - 11621

PROVENANCE: Fluvial deposits of Solo River, Trinil beds of Kabuh formation (CFH III: 113-114). Traditionally considered Middle Pleistocene in age, this could neither be denied nor confirmed from rigorous chemical analysis of the specimen (Day and Molleson 1973). These authors conclude that given its sapient (=modern) anatomy in contrast to other non-sapient femora of undoubted Middle Pleistocene antiquity, the date of this Trinil femur must be considered doubtful.

DESCRIPTION: Alleged *Homo erectus* adult female, left femur.

DENTAL AGE:

COMMENT: The scale visible to the right of the specimen is in centimeters.

: The most interesting feature of this femur is a massive irregular exostosis on the medial side of the shaft below the lesser trochanter. According to Day and Molleson (1973) "Radiographs confirm that it was an

COMMENT:
(Cont'd.)

ossifying lesion whose spurs are made up of both cortical and trabecular bone" (p. 133). The common explanation for this condition is myositis ossificans; i.e., inflammation of muscle tissue marked by ossification of muscle. Given the apparent drainage channel through the exostosis and irregularity of the projecting bone, it seems most likely that this individual suffered a traumatic wound to the inside thigh with penetration through the cortex and subsequent bleeding into the muscle tissues. Consequent suppuration due to infection and ossification of extravasated blood would produce the appearance seen on the femur.

VIEW: Dorsal.

LOCATION OF ORIGINAL:

Radiograph supplied by T. Molleson, Sub-Department of Anthropology, British Museum (Natural History); specimen at Rijksmuseum van Natuurlijke Historie, Raamsteeg 2, Lieden, Netherlands.

Trinil 3, Indonesia



C A N A D A

Fig.

SITE: Taber, Canada.

SPECIMEN: N.M.C. No XV-C5, Taber 1 (CFH III: 30).

PROVENANCE: Upper Pleistocene, Wisconsin, A4: ca. 30,000 B.P. by correlation with similar dated till (CFH III: 30).
(Date questionable.)

DESCRIPTION: *Homo sapiens sapiens* immature left mandible (plus cranial and postcranial items), containing: 7-4(LDMT)/B5/, 7-5(LDMZ)/C4/, 3-6(LMT)/C2/.

DENTAL AGE: 0.9 (0.7-1.1), 0.9 (0.7-1.0) years.

COMMENT: Recent attempts (1979) by R. Forbis and M. Wilson (U. of Calgary) to find datable organic remains, from the find locale, referable to the specimen proved fruitless (pers. comm.).

VIEW: L., left mandible.

LOCATION OF ORIGINAL:

Radiograph courtesy of J.S. Cysulski, Chairman, Physical Anthropology Programme, Archaeological Survey of Canada, National Museum of Man, Ottawa K1A 0M8, Canada.

Taber, N.M.C. No. XV-C5, Canada



Fig.

SITE: Old Crow Flats, Yukon, Canada.

SPECIMEN: "Yukon Mandible," "Old Crow Specimen."

PROVENANCE: Upper Pleistocene or Early Holocene, Loc. 11A, point bar deposit, at a depth of ca. 30 cm., 20,000 + B.P. on colour correspondence with dated bones from other locales. River deposited artifacts associated (Irving, et al. (1977)).

DESCRIPTION: *Homo sapiens* ssp. immature right mandibular corpus portion (and ascending ramus), containing: 8-5(RDM $\overline{2}$)/A8/, 4-5(RP $\overline{4}$)/C6/, 4-8(RM $\overline{3}$)/C3/.

DENTAL AGE: 12.0 (9.0-12.9), 11.5 (9.5-12.3) years.

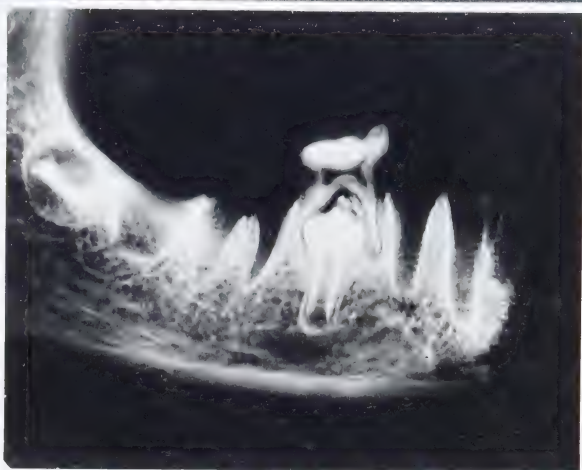
COMMENT: There is pronounced distal root resorption on 8-5 which shows pronounced attrition and pulp cavity diminution.

VIEW: a) B., right corpus.

LOCATION OF ORIGINAL:

Radiophotograph courtesy of Dr. J. Melbye, Department of Anthropology, Erindale College, University of Toronto, Mississauga, Ontario, L5L 1C6.

Old Crow Flats, Canada



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